



**Blair DeSoto Environmental Education Partnership**  
*Blair Community Schools and DeSoto National Wildlife Refuge*



# Curriculum Guide



## **Blair/DeSoto NWR Outdoor Education Partnership**

*Blair Community Schools*

*DeSoto & Boyer Chute National Wildlife Refuges*







# Blair DeSoto Environmental Education Partnership

*Blair Community Schools and DeSoto National Wildlife Refuge*



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# Blair DeSoto Environmental Education Partnership

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## Mission Statement

Creating a sense of wonder and stewardship through environmental education in an outdoor classroom, a partnership with Blair Community Schools, “Where All Students Learn,” and DeSoto National Wildlife Refuge, “Where Wildlife Comes First.”

We achieve this mission by:

- Empowering students and teachers to have authentic, learning experiences in nature’s outdoor classroom
- Connecting students with the environment and related issues
- Provide an opportunity for education to be fun and challenging
- Creating a partnership for environmental education that meets Blair Community Schools and Nebraska State Standards
- Recognizing and sharing the accomplishments of the partnership with the community

This partnership would not be possible without The Friends of Boyer Chute and DeSoto National Wildlife Refuge. Their contributions of countless volunteer hours and financial support help us to succeed.







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## Strategic Plan Goals

1. Provide every student with the opportunity to experience environmental education in the outdoor classroom.
2. Provide a diversity of inquiry-based, cross-curricular lessons.
3. Secure funding through diversified revenue streams.
4. Create an infrastructure to achieve quality and sustainability.
5. Evaluate and quantify program results.
6. Maintain a dedicated environmental education position at DeSoto National Wildlife Refuge.
7. Develop an advanced program.
8. Promote the program to families and the community.

### Goal 1:

Provide every student with the opportunity to experience environmental education in the outdoor classroom.

Rationale: Joining students with nature in the outdoor classroom will instill a sense of wonder and broaden the students' natural curiosity to learn about the environment. This will build a stewardship with the students and the environmental issues we currently face. Learning in the outdoor classroom will help develop the students' observation, problem-solving, critical thinking, and communication skills.

### Goal 2:

Provide a diversity of inquiry-based, cross-curricular lessons.

Rationale: Utilizing the outdoor classroom in conjunction with a traditional classroom can enhance student learning in core subject areas. Expanding the curriculum to follow the route of the migratory waterfowl allows the students to study geography as well as social studies and cultural studies of people along the flyway. Language arts skills are enhanced by writing about learning experiences. Fine arts are utilized through drawings, paintings, or pictures of their outdoor experience. Exploratory technology can be incorporated through digital photography, blogs, video storyboards, software, and computer use.







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### **Goal 3:**

Secure funding through diversified revenue streams.

Rationale: Funding is provided by Blair Community Schools, DeSoto National Wildlife Refuge, Blair Community Foundation Grant, The Friends of Boyer Chute and DeSoto National Wildlife Refuge, and various other grants. We will continue to actively seek alternative funding sources as well as local corporate sponsor to secure the future financial health of the program.

### **Goal 4:**

Create an infrastructure to achieve quality and sustainability.

Rationale: Build on the program to produce the highest educational standards while responsibly managing associated cost. Create learning resources to attract families to Blair Community School for education.

### **Goal 5:**

Develop formal evaluation techniques.

Rationale: Utilizing the students' field notes and naturalist journals, writing assignments, blogs, fine arts, exploratory technology displays, and open discussions of the outdoor learning experiences, teachers will be able to evaluate the level of understanding the students have achieved.

### **Goal 6:**

Maintain a dedicated environmental education position at DeSoto National Wildlife Refuge.

Rationale: In order to provide continuity and stability in the environmental education program a full-time Environmental Education Specialist will be placed at DeSoto NWR. This is currently in place.

### **Goal 7:**

Develop an advanced program.

Rationale: Provide an opportunity for students who demonstrate interest, ability and task commitment to participate in advanced learning opportunities using the DeSoto outdoor classroom. This program was pilot tested during 2012-2013 school year and will expand for the 2013-2014 school year.

### **Goal 8:**

Promote the program to families and the community.

Use media, chamber of commerce, business and personal relocation companies and education websites to promote the partnership with Blair Community School and DeSoto National Wildlife Refuge.







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### At a Glance

Inspired by a visit of Blair Community Schools' teachers and administrators to the U. S. Fish and Wildlife's Prairie Wetlands Learning Center in Fergus Falls, Minnesota, the outdoor classroom partnership with Desoto National Wildlife Refuge was established in 2006. This partnership involves students in third grade, fifth grade, sixth grade, seventh grade, eighth grade and high school. These students will visit DeSoto National Wildlife Refuge six or more times in an academic year.

So far, the program has produced:

2006-07: 63 programs and 2,200 student visits

2007-08: 74 programs and 2,200 student visits and one educator workshop

2008-09: 89 programs and 2,954 student visits and one educator workshop

2009-10: 79 programs and 2,887 student visits and one educator workshop

2010-11: 109 programs and 4,159 student visits and one educator workshop

2011-2012: 159 programs and 4,817 student visits and one educator workshop

2012-2013: 127 programs and 4,123 student visits and one educator workshop

2013-2014:







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## Programs

### 3rd Grade

- Late Summer Exploration
- Fall Exploration
- Winter Exploration
- Spring Exploration

### 5th Grade

- National Wildlife Refuge System Orientation
- Sense of Wonder
- Prairie Exploration
- Wetlands and Fall Migration
- Beavers
- Winter Tracking and Birding
- Eagles
- Sensory Awareness
- Outdoor Education Days

### 6th Grade

- Leaf Study and Inference Short Story
- Soil Composition, Erosion, Deposition, Floodplain
- Migrating Birds—The Canada Connection
- Physical Properties, Mass/Volume/Density Snow Study

### 7th Grade

- Habitat Lab Scavenger Hunt
- Insects
- Fish Sampling
- GPS Scavenger Hunt
- Bertrand Museum Tour and Artifact Conservation
- Bird Observation







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## 8th Grade:

- Descriptive Writing and Observation
- Five Themes of Geography
- Bertrand Site Measurements
- Leaf and Bark Rubbings
- Graphing Lesson Base on Data Collected at the Refuge

## 6th, 7th, and 8th Grades

- Exploratory technology after school program: teach digital photography, iMovie, Garage band, Photoshop, software producing movies, slideshows, podcasts, tripod and monopod use
- High Ability Learners– water quality labs

## High School

- Ecosystem Observation Hike
- Biomes
- Use of Identification Books and Guides
- Soil Testing
- Water Quality
- Fire Ecology

## Educator Workshops

- Various topics to enhance the teachers' knowledge of the refuge and the outdoor topics being taught
- Approximately twenty teachers, staff, and administrative personnel from Blair Community Schools, along with staff and volunteers at DeSoto NWR guide students in the outdoor classroom.







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# KWHL In the Outdoor Classroom

A KWHL chart (**Know-**Wonder-**How-**Learned****) is type of graphic organizer that serves as matrix for planning and gathering information. It is an instruction activity developed by Donna Ogle (1986, National Louis University) which serves as a model for active thinking during reading. We adapt it for use in science. KWHL charts are excellent tools for identifying prior knowledge, developing a plan for investigation of a problem or topic, and summarizing newly acquired knowledge and skills. They are also an excellent tool to plan for field investigations in training students as scientists. A KWHL inquiry chart can include questions about predictions and/or implications. Additionally, these charts can be used as a basis to formulate a hypothesis, or research question, resulting in confirmation or denial as your research progresses.****

The use of KWHL charts engages students in active thinking as they determine:

**What do we already Know?** In this section students identify, share, and make connections to their existing knowledge. Misconceptions and disagreements may emerge that result in the formulation of questions for further investigation.

**What do we Want or need to find out?** Students determine what they want to learn. What do they **Wonder** about the topic? These statements can be easily revised into questions to be investigated in the field. Instructors may need to guide students in eliminating less relevant or practical questions from the brainstormed list which cannot be answered by the parameters of field work. Students develop essential questions and may also identify areas of disagreement for further investigation.

**How are we going to find out?** Students identify resources and develop a plan for gathering the information needed to answer their essential questions. Investigation processes, protocol, and tools can be included here. Primary and secondary methods can be identified. Primary resources could include ponds, prairie, observation, measurement, etc., while secondary resources may include field guides, Internet, encyclopedias, interviews, and other methods to be used after the investigation to extend the experience.

**What have we Learned?** In this section students identify and summarize their newly acquired knowledge and skills. These statements can be adapted for answers to their questions. What they have learned often leads to the development of additional essential questions for future investigation and/or a consensus of opinion.







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# KWHL In the Outdoor Classroom

**Additional columns** may be added to fulfill the scientific process, such as Conclusions, New Questions for further investigation, and Recommendations. A column expressing **Why** the specified outdoor resource is important helps link their field work with the mission of the U.S. Fish and Wildlife Service (e.g. why is the prairie important?) With this framework, students can then write a scientific report or present a speech with all or many of the sections commonly used by scientists in communicating their results with other scientists and ultimately the public. The KWHL process naturally leads to continued investigation, increasing validity of results and/or expanding research.

### Why Use KWHL?

KWHL allows students to discover more for themselves without front-loading of information and direction by instructors.

KWHL helps students find purpose in their learning. Students direct their learning and build on past knowledge, which seems to increase their loci of control, motivation for learning, and ownership in the investigation. Organizing information and making the process visible helps student tap into and possibly revise their organization of prior knowledge as they gain skills in thinking about thinking.

KWHL promotes higher-order thinking for both students and instructors, allowing for a genuine two-way exchange of ideas and thinking between both. Instructors may be pleasantly surprised by the type of knowledge and by the critical thinking students demonstrate.

KWHL parallels the scientific method and may directly support state and national academic standards for inquiry-based learning and use of the scientific method.

Training students as scientists in their use of the scientific method through investigation of the outdoor classroom supports the mission of the National Wildlife Refuge System and the vision of the U.S. Fish and Wildlife Service.

### Challenges to Using KWHL

Instructors may experience fear and resistance because of inherent risk-taking involved in experimenting with a different and less familiar teaching approach.

KWHL may involve more “seat time” for students if time is not carefully managed.

Instructors need to be attentive to integrating the mission of the Refuge System where most appropriate. Consider adapting the chart with an additional column to ensure making this critical link.







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# KWHL In the Outdoor Classroom

## Resources

"The K-W-L: A Teaching Model that Develops Active Reading of Expository Text" by Donna Ogle.  
*The Reading Teacher* 39 (1986): 564-70.

Thematic Unit—Owls, by Fran Van Vorst, Teacher Created Materials, 1999.

Graphic Organizers, Enchanted Learning, <http://www.enchantedlearning.com/graphicorganizers/KWHL>

Inquiry 101, Thinking Like a Scientist, <http://www1.extension.umn.edu/environment/fwce/conservation-education/citizen-science/docs/fwce-thinking-like-a-scientist.pdf>

KWHL Chart Maker, <http://www.worksheetworks.com/miscellanea/graphic-organizers/kwhl.html>

K-W-L-H Technique, North Central Regional Educational Laboratory, <http://www.ncrel.org/sdrs/areas/issues/students/learning/lr1kwlh.htm>

Metacognition, an Overview, by Jennifer L. Livingston, <http://www.gse.buffalo.edu/fas/shuell/CEP564/Metacog.htm>

What are the benefits of constructivism? [http://www.thirteen.org/edonline/concept2class/constructivism/index\\_sub6.html](http://www.thirteen.org/edonline/concept2class/constructivism/index_sub6.html)







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# Nature Journaling

This nature journaling lesson contains the fundamentals of our philosophy towards nature journaling and the importance of journaling to environmental education. By reading this lesson, it will help inform the understanding of all other lessons where nature journaling is a component.

Overview	After a mini-lesson on nature journaling, students participate in a field activity, investigation, or lab, recording their observations, data, and discoveries in their field journals. Students share their results and reflect upon their discoveries, then determine how they will use their material in order to share their experience with others. Suitable for novice and experienced journalists alike.
Subjects Covered	Science, Language Arts, Math, Art
Skills Used	Observing, writing, sketching, sequencing, data collection, reflecting, and others depending upon the activity
Performance Objectives	<p>After completing this activity, students will be better able to...</p> <ul style="list-style-type: none"><li>• Define the word journal (a daily record of observations)</li><li>• Correctly sequence the steps to using a nature journal (go outside, observe, record, reflect, use)</li><li>• Name three ways of recording observations in a nature journal (words, numbers, pictures)</li><li>• Recognize that observations are made using multiple senses (sight, sound, touch, smell)</li><li>• Name four kinds of things that could be recorded in a nature journal (title, date, location, weather, observations, wonder, questions)</li><li>• Suggest two reasons why to keep a nature journal (history, polished writing or art, connect with land, slow down, fun, relax, reflect)</li><li>• Enjoy using a nature journal</li></ul>
Vocabulary	Journal, sketch, observation, reflect







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# Nature Journaling

### Background Information

*“The student may wonder at the time what good it all is. One answers that, first, it is always useful to have a record of one’s doings; but, more important, writing a fact makes one observe it better.”*

-- Ernest Thompson Seton

The purpose of this lesson is to introduce nature journaling to elementary students. “Nature journaling is the process of keeping a place-based, personal record of events, observations, and experiences in the outdoors.” (Hofmann and Passineau) That process is typically an ongoing one and may start at the PWLC or continue and expand here for those who have already learned how to journal. Or, perhaps the school teacher simply wishes to allow students to dip into in a different method of keeping records and recording thoughts. Students learn journaling best, however, by journaling on a repeat basis as part of an ongoing process.

Compared to journals in general, a nature journal is unique in that *place* takes on a central role as the main subject along with the journalist as observer. “There is a deeper awareness of the setting, seasons, and other species.” (Hofmann) A journal may be a phenology log; a field guide to animals, plants, geology; and an explorer’s log of journeys and findings. It may also be a collection of reflections about a place and connections with it. Its content is not just intellectual or just emotional – it is *both*.

As learning tools, nature journals can serve a broad spectrum of purposes. A nature journal is a flexible teaching tool which is easily integrated with most academic subjects. It is adaptable to all learning styles and abilities and a source of endless individualization possibilities. Nature journaling provides opportunities for authentic learning which incorporates writing and drawing as major elements and therefore uses verbal, nonverbal, analytic, logical, spatial, and synthetic abilities. Using a journal allows students to lead their learning with their own questions making it student and inquiry driven. Journals can include both personal expressions and objective observations. Objective information might include scientific experiments, weather, wildlife behavior, and seasonal changes. Keeping a nature journal can be a powerful experience because it helps the observers slow down, carefully take note of their surroundings, make first-hand, concrete observations of nature, and become better observers. Good science depends upon keen observations, and nature journaling is an effective way to develop that skill.







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# Nature Journaling

John Muir wrote in his journals “about the beauty he saw in nature. He also drew sketches detailing information about plants, animals, mountains, glaciers, and landscapes. He used his journals to compose letters to friends, articles, and books to share his love of nature, and to enlist people's support to preserve wilderness. Muir's journals gave him a wealth of recorded experience from which 10 books and over 200 articles were published. People continue to gain insight into nature's beauty and importance in our lives from his writings.” (Sierra Club) Likewise student journals can be a source of raw data and information from which to write poems, reports, and speeches or develop posters, songs, art, and other polished work.

Intertwined with its value as a learning tool, keeping a journal allows time for reflection and relaxation. It allows thinking and feeling with both head and heart as a naturalist, a combination of intellectual learning about the environment and emotional connection and attachment to a place. Rather than rushing through a natural area, students have personal time and a direct experience which can help them feel more connected to the land and develop a sense of place. A nature journal provides an opportunity to study the natural world, to grow a deeper relationship with the earth, to develop a greater awareness and caring for it. “For many students, life in the artificial environment of climate-controlled schools, malls, and automobiles make the natural environment seem peripheral and irrelevant. In addition, formal learning is increasingly based on electronic, prepackaged information transfer.” Yet science teachers know there is no substitute for direct experience to motivate and engage students. Done repeatedly over time, nature journaling offers sustained contact with neighborhood nature. Further, personally created nature journals provide students with ownership of their experiences and reinforces active learning. (Dirnberger, McCullagh, and Howick) Students capture and claim moments with the world around them.

Journal keeping is historical, used by individuals who left wisdom and knowledge through their journals. Through the ages, scientists, artists, authors, poets, explorers, and many others have kept journals to record their observations and experiences including Leonardo da Vinci, Carl Linneaus, Thomas Jefferson, Meriwether Lewis and William Clark, John Muir, and more recently, Olaus Murie, Aldo Leopold, and Rachel Carson. Some naturalists even started a lifelong practice of journaling in childhood, including John James Audubon and Ernest Thompson Seton. Numerous occupations today require documentation in journals. Horticulturalists keep phenology journals to record plant growth. Museum exhibit curators keep a journal account of a specimen collection. Biologists rearing and releasing the endangered whooping cranes record daily observations of health information such as diet and weight as well as daily distances traveled following an ultra light aircraft. As a tool of many jobs, journaling is a valuable skill for students to develop.







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# Nature Journaling

Journals can be started using a few simple tools: several sheets of loose leaf paper, a hard writing surface (a clipboard will suffice in the field), and a writing utensil. Consider binding papers together with a staple or two, providing multiple pages to use over a period of time. At the start of each journal entry, record the date, time of day, location, and weather (air temperature, wind speed and direction, description of the sky, etc.).

After recording this basic information, a student can choose something more specific to study. While in the field, students should be encouraged to record information without using field guides or other textbooks because this encourages them to improve their own observation skills. Back in the classroom, students can refer to their journal entries to research and find more information about what they observed. With advanced training and practice, they may even use their journals as a tool to accurately identify unknown plants and animals.

Although many students will need some help getting started, one need not be an expert naturalist, writer, or artist to guide others in nature journaling. Enthusiasm, a wide range of field activities, and journaling and discovering alongside students draws them in, inspires them, demonstrates the value of journaling, and allows instructors to enjoy the benefits of journaling, too. The instructor is more aptly named the collaborator, guide, coach, or facilitator.

Nature is the true source of inspiration for a nature journal. Observing nature is more important than writing and is the heart of the journal. Students should observe first and write second because observing is what gives them something to write about. Once writing begins, it may be helpful to look back and forth between the page and the subject. Journals can also include sketches, rubbings, maps, colors, tables, measurements, questions, wonder, surprise, mystery, delight, and beauty. Avoid editing for spelling, grammar, and punctuation in the field. However, editing for accuracy in content is a valuable use of time and essential to the field journaling process. Key to deeper thinking, reflection time allows students to process their experience intellectually and emotionally, infer meanings, and draw connections and conclusions.

After students have completed their journal entries, providing an opportunity to share their observations with others in their group can further increase learning. Sharing provides students with the opportunity to show what they saw and learned. It can help students see the diversity of observations that can be made in nature and the diversity of journaling styles among students. Further, teachers are afforded a valuable glimpse at students' metacognition. Such is the journey that journaling can lead as students make discoveries about their home biome and also about themselves.

*"I write to record the truth of our time, as best as I can see it....*

*I write to make a difference....To honor life and praise the divine beauty of the world. For the joy and exultation of writing itself. To tell my story."*

Edward Abbey, One Life at a Time, Please







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# Nature Journaling

## Teacher Preparation

To maximize outdoor classroom time at the PWLC, teachers may

Conduct steps 2-4 in the section “Nature Journaling Procedure” at school. Upon arrival at the PWLC, teachers may provide PWLC staff with a written list of what students know and wonder for quick review before heading out into the prairie.

Organize students into small groups at school, each led by a chaperone, and everyone wearing nametags.

Please help save paper. Bring your students’ science notebooks or journals to record their field data and discoveries in. To make journals, see section “Make a Nature Journal,” visit [http://www.sierraclub.org/education/nature\\_journal\\_template.pdf](http://www.sierraclub.org/education/nature_journal_template.pdf) for a booklet template, or simply staple half sheets of paper together. If science notebooks or journals are not available, please inform the PWLC staff that you will need paper and clipboards when booking your date.

- Select which field investigation, activity, or lab your class will participate in. Please see section “Field Activity Options.” Please inform PWLC staff of your choice when booking your date.

We highly recommend conducting one or more of the suggested extensions before your visit in order to integrate this field investigation into the classroom study of nature, scientists, naturalists, writing, journals, animals, prairie, wetlands, habitat, or other topics. We believe such integration enhances student motivation for learning in other curricular areas. See section, “Teacher-Led Extensions/Adaptations/Assessment Ideas.” For suggested literature launchers, see section, “References and Resources.”

## Staff Preparation

Gather materials and appropriate equipment depending upon the grade and topic selected. Choose which field site to use.







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# Nature Journaling

## Nature Journaling Procedure

1. In the classroom, welcome students, teachers, and chaperones to the Prairie Wetlands Learning Center.
2. Begin a mini-lesson on nature journals. Ask students to tell you what a nature journal is. Write down their responses as a list on the board. Appropriate responses might include a book with words, sketches, numbers, and observations that are honest and true. Add any items to the list that they did not mention.
3. Ask them how someone starts a nature journal – what steps would they follow? Write down their responses as a separate list on the board. Appropriate responses might include go outside, make careful and first hand observations, record observations such as weather, beauty, feelings like wonder and surprise, questions, meanings. Record what you find, the truth, not something imagined. Add any items to the list that they did not mention.
4. Ask student why someone would keep a nature journal? Write down their responses on the board as a third list. Appropriate responses might include to keep a record, to record history, to relax, to slow down, to reflect, to connect with the land, to use later for polished writing or art.
5. Show students examples of nature journals, yours and/or others. Show them examples of Ernest Thompson Seton's journals and read excerpts from page 87 of By a Thousand Fires by Julia M. Seton.
6. Ask students to open their own science notebooks or field journals to the next blank page. Depending upon the grade and field activity, show them how to set up their page as a data sheet with a title, date, location, and quadrants to collect and record information about their given topic.
7. Allow them to suggest what kinds of things they will record on this page for three of the quadrants, and provide each quadrant a subtitle accordingly. For example, if the class will go outside to observe birds, in one quadrant they might record how many different kinds of birds they see; in another, they might sketch their favorite bird; and in the third, they might write down as many adjectives as possible to describe their favorite bird. In the fourth quadrant, they do a contour sketch.
8. Explain and demonstrate how any necessary field equipment will be distributed and used. Provide that equipment to each chaperone to distribute to their small group of students.
9. Line up at the door and remind students that they are naturalists. How do naturalists behave outside? (respectful, quiet, in the moment, etc.)
10. Start by demonstrating how to do a contour sketch and allowing them time to do one in their journals. Lead a brief discussion on what they discovered about themselves and journaling from this exercise. (it captures the essential quality of the subject; it makes you slow down and observe more carefully; journaling is about the process or journey not the product or destination)







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# Nature Journaling

## Nature Journaling Procedure

11. Conduct the chosen field activity. Move from group to group to provide assistance and answer questions. Model good naturalist behavior for them to follow.

- a. Encourage students to use their powers of observation to look slowly and closely.
- b. Prompt them with questions to help them truly perceive (notice using senses, especially something others miss): *What do you notice? What does it remind you of? Is there a mood? What does it mean? What does it make you wonder about? What questions do you have about it?*
- c. Record your own observations and data in your own field journal. Your example validates their journaling activity as important and demonstrates that learning is a lifelong pursuit.

12. Back inside, collect equipment and ask students to share their discoveries with each other in their small groups. Ask a few students in the class to share their discoveries with everyone.

13. Explain that naturalists usually use their nature journals as a source of information for polished writing or art. Ask students to think of one way they could use their journals to share their experience with someone who wasn't here today. Who will they share it with and how? Some possibilities include sharing it with a friend or relative by writing an email or letter, by making a card or picture. They might share with others at school by creating a mural, play, poem, story, or song.

14. Encourage them to keep going outside anywhere they are to explore and to use their journals; it is free and interesting and keeps them occupied. Thank them all for coming to the PWLC and invite them to return again.







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# Nature Journaling

## Field Activity Options

Teachers choose one of the following options for their field activity and inform PWLC staff when booking.

### Kindergarten – 2<sup>nd</sup> Grade

Topic	Field Activity	PWLC Materials
1. Snow crystals (December through March)	Observe falling snow crystals with hand lenses, describe, sketch, measure, and identify them	Hand lenses/loupes, microscopes, rulers, snow crystal charts
2. Wetland Invertebrates	Collect, examine, describe, measure, sketch, and release wetland “bugs”	Nets, hand lenses, bug boxes, colored pencils, keys/cards
3. Nature journaling sampler	Use several tools to aid in prairie wetland journaling such as hand lens, cloud chart, view finder, compass, thermometer, and binoculars	Let's Go Outside backpacks
4. Nature detectives (December through March)	Search for evidence of animals, describe, sketch, infer, and tell a story about what happened	
5. Weather Trek	Practice using a thermometer, ruler or meter stick; record data and sky observations	Thermometers, rulers, meter sticks, cloud charts
6. Patterns in Nature	Look for numbers, letters, and shapes in the prairie and wetlands	<u>ABCs Naturally</u> by Lynne Diebel and Jann kalscheur







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# Nature Journaling

3<sup>rd</sup> – 6<sup>th</sup> Grades

Topic	Field Activity	PWLC Materials
1. Reading the land (December through March)	Search for evidence of animals, describe, sketch, infer, and tell a story about what happened	<u>A Sand County Almanac</u> , identification cards
2. Snow crystals (December through March)	Observe falling snow crystals with hand lenses, describe, sketch, measure, and identify them	Hand lenses/loupes, rulers, snow crystal charts
3. Winter ecology (December through March)	Measure and observe the snow pack, record temperatures, find and observe pond ice	Rulers, meter sticks, hand lenses, thermometers
4. Byrd Baylor – favorites OR celebrations	Listen to a story, then go outside to find and record your favorites or celebrations	Byrd Baylor book
5. Wetland Invertebrates	Collect, examine, describe, measure, sketch, and release wetland “bugs”	Nets, hand lenses, bug boxes, colored pencils, keys/cards
6. Mapping – sounds, colors	Make one or two maps of a wetland/prairie to depict colors/sounds	Colored pencils, compasses
7. Nature journaling sampler	Use several tools to aid in journaling such as hand lens, cloud chart, view finder, compass, and thermometer	Let’s Go Outside backpacks
8. Sketching Nature	Practice various observation and art techniques such as sketching basics, contour sketching, gesture sketching, scribble	colored pencils, view finders, clipboards, prairie plant brochures or
9. Weather Trek	Practice using thermometer, wind meter, compass, ruler or meter stick; record data and sky observations	Thermometers, wind meters, compasses, rulers, meter sticks, cloud charts







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# Nature Journaling

## Weather Alternatives

Field investigations take place rain or shine. Everyone should dress appropriately for the weather. In the event of unsafe weather (lightning, high winds, extreme cold) or pouring rain, everyone must come indoors. PWLC staff make every effort to make your travel worthwhile despite the weather and prepare indoor, age-appropriate plans. PWLC staff welcomes teacher input into these plans. Some possible alternatives might include:

- Go outside for a very short amount of time, even if only under the deck to conduct the chosen field activity if possible.
- Bring plant/seed or aquatic invertebrate samples indoors for examination.
- Use mounted specimens, furs, and/or skulls of birds and mammals.
- Use latex animal tracks with ink pads to create stories.
- Conduct a map scavenger hunt indoors. See 6<sup>th</sup> grade, fall lesson, “Mapping a Prairie Wetland.”
- Tour the exhibit area and watch prairie wetlands videos in the sod house theater with the objective of searching for birds, invertebrates, plants, or observing seasonal changes in the land and weather.

## Staff-Led Adaptation

For younger students (K-2), modify the mini-lesson on nature journals by first asking what nature is and then what a journal is. Explain a few reasons why people keep a nature journal. Then continue on with getting ready to go outside, but leave their journals or papers in the classroom. Conduct the field activity and then return to the classroom. Ask students to draw a picture of their favorite thing they did or saw outside (or the most beautiful thing or the strangest thing, etc.). Chaperones can help children who cannot write by adding a few labels or a caption. Collect the papers and provide them to the teacher to bring back to school and make a class journal, each student’s paper serving as a page in the journal. A cover can be created with a title such as, “Our Class Nature Journal of the Prairie Wetlands Learning Center.” Display the class journal for visitors to see, such as parents during conferences, or send it home with a different student each week to share with families.







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# Nature Journaling

### Teacher-Led Extensions/Adaptations/Assessment Ideas

- Conduct steps 2 through 4 of the *Nature Journaling Procedure* outlined above at school prior your visit. This will allow your students more time outdoors at the PWLC. Please inform PWLC staff when booking if you will be conducting the mini-lesson at school so staff can plan accordingly.

Students may wish to make and bring their own nature journal to use at the PWLC. See section, “Make a Nature Journal,” for one possibility. To make a twig-bound journal, visit <http://bringinguplearners.com/2008/01/28/homeschool-hacking-tips-make-your-own-nature-journal/>.

- Read an excerpt from The Sense of Wonder by Rachel Carson, and then take a walk to find examples of wonders in nature. Record them in field journals.
- Visit the same place outside with your students on a regular basis, such as daily, weekly, monthly, seasonally, or annually. Record changes over time in journals.
- Explore your school grounds or local park together, and then sit in silence as students use their nature journals to complete a free write.
- Send journals home with students to make observations and discoveries in their yards. They can replicate a field activity done at school and/or at the PWLC, then compare and contrast results from each site.
- Periodically pair students up and have a journal exchange. Students read each others’ journals to make new discoveries about how to journal and individualization. Provide prompts to guide discussion. Comments may be shared verbally or in writing.
- If cameras are available, use them in combination with writing and sketching. For example, using field notes recorded when journaling, write a poem to accompany a photo. Compare and contrast something that was both sketched and photographed.
- Draw connections to curriculum with nature journals. Link them to academic activities when possible such as for science concepts and vocabulary, spelling, writing (similes and metaphors, onomatopoeia, punctuation, adjectives, verbs, nouns), poetry, art, math (fractions, percents, mean, mode, median, measurements, benchmarking), local history, and data organization and interpretation.
- Explore the lives and writings of famous naturalists, role models for nature journaling. Some possibilities include Lewis and Clark, John Muir, Aldo Leopold, and Rachel Carson. Read biographies about them, dress like them, watch or listen to recordings of them, and most importantly, apply their ideas to student journaling.







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# Nature Journaling

- Use journal entries to produce polished work in creative writing, science, art, or music, key to preventing nature journaling from becoming a form of “busy work.” Teaching how to use journals outside is a first step. Complete the process by allowing students to productively use it to share their discoveries with others, just as adult naturalists and scientists do. They might write reports, write and present speeches, create a class publication (field guide, newsletter, literary collection, phenology calendar, audio/video recordings), lead guided tours, organize a gallery display and reception, or hold a conference to share discoveries made through journaling. Some of these options would also be adaptable for web site publishing and class fundraisers complete with a book signing, public reading, or celebration.
- As a class, write a free-verse poem using observations from field journals. Each student writes one thought about their experience. Go systematically around the room and ask each student to read their thought aloud. Write each thought on a poster sized piece of paper on the wall. Each student reads the previous student’s sentence and adds their own to it, building the poem. Each sentence gets written on the poster, but cover the preceding lines so only the previous sentence shows. Once each student’s sentence has been read and recorded, then uncover the completed poem and read it aloud. Add photos or art if desired and display for others to enjoy.
- Read student journals regularly and provide written encouragement, questions, or further information.
- Allow students to evaluate their own journal. Provide prompts such as -- which entries are their favorites and why? Do they see patterns among the entries? What would someone reading their journal 100 years from now discover about them and their place?
- Grade certain journal entries using an assessment rubric and clear criteria.
- Give an open-journal quiz which bolsters incentive to make complete entries.
- Pair students with buddies to introduce journaling to younger students.

## References and Resources

### Books and Web Sites for Adults

- [A Sand County Almanac](#) by Aldo Leopold
- [Backyard Almanac, a 365-Day Guide to the Plants and Critters that Live in Your Backyard](#) by Larry Weber
- [By a Thousand Fires, Nature Notes and Extracts from the Life and Unpublished Journals of Ernest Thompson Seton](#) by Julia M. Seton
- [Field Notes on Science and Nature](#) by Michael R. Canfield, editor
- [Into the Field, a Guide to Locally Focused Teaching](#) by Clare Walker Leslie, John Tallmadge, and Tom Wessels
- [Jim Gilbert’s Minnesota Nature Notes](#) by Jim Gilbert
- [Journal of a Prairie Year](#) by Paul Gruchow







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# Nature Journaling

- Keeping a Nature Journal, Discover a Whole New Way of Seeing the World Around You by Clare Walker Leslie and Charles E. Roth
- Moon Journals: Writing, Art, and Inquiry Through Focused Nature Study by Joni Chancer and Gina Rester-Zodrow
- Nature Journaling, a Creative Path to Environmental Literacy, a Guide for Sinking Roots in Place and Branching Out Toward Environmental Literacy in Grades 4-8 by Kate Hofman
- One Square Mile, an Artist's Journal of America's Heartland by Cathy Johnson
- Project Bluestem, Neal Smith National Wildlife Refuge, U.S. Fish and Wildlife Service
- Rhythms of the Refuge, Horicon National Wildlife Refuge
- The Naturalist's Field Journal, a Manual of Instruction Based on a System Established by Joseph Grinnell by Steven G. Herman
- The Sense of Wonder by Rachel Carson
- Using Science Notebooks in Elementary Classrooms by Michael P. Klentschy
- "A Nature Journaling Guide: Fostering a Naturalistic Outlook" session presented by Kate Hofmann and Joe Passineau, University of Wisconsin-Stevens Point, at the North American Association for Environmental Education Conference, Biloxi, Mississippi
- "Folding Memories" by Janine Newhouse, Strides newsletter by Leopold Education Project, Winter 2006
- "Writing and Drawing in the Naturalist's Journal," by Joseph M. Dirnberger, Steven McCullagh, and Tom Howick. The Science Teacher, January 2005
- Teaching in the Outdoor Classroom educator workshop, Prairie Wetlands Learning Center, Dave Ellis, instructor
- How to Draw Birds for a Naturalist Journal, <http://www.wildernesscollege.com/how-to-draw-birds.html>
- Introduction to Nature Journals, [http://www.smithsonianeducation.org/educators/lesson\\_plans/journals/index.html](http://www.smithsonianeducation.org/educators/lesson_plans/journals/index.html)
- Keeping a Nature Journal, [http://www.sierraclub.org/education/nature\\_journal.asp](http://www.sierraclub.org/education/nature_journal.asp)
- Make a Twig Nature Journal, <http://bringinguplearners.com/2008/01/28/homeschool-hacking-tips-make-your-own-nature-journal/>
- Nature Journaling, <http://gnmparents.com/the-littlest-naturalists-part-iii-nature-journaling/>
- The Field Book Project, <http://www.mnh.si.edu/rc/fieldbooks/>
- The Nature Journal as a Tool for Learning, <http://www.newhorizons.org/strategies/environmental/matsumoto.htm>
- Writing and Drawing in the Naturalist's Journal, [http://www.nsta.org/store/product\\_detail.aspx?id=10.2505/4/tst05\\_072\\_01\\_38](http://www.nsta.org/store/product_detail.aspx?id=10.2505/4/tst05_072_01_38)
- The Illustrated Nature Journal, a Handbook, <http://www.pinicola.ca/jourbook.htm>
- Wheels of Time and Place, <http://partnersinplace.com/wheels-of-time-and-place>







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# Nature Journaling

### Books and Web Sites for Children

- By the Shores of Silver Lake by Laura Ingalls Wilder, excerpts from “The West Begins,” “Shanty on the Claim,” and “Where Violets Grow.”
- Cloud Dance by Thomas Locker
- Draw and Color Insects by Walter Foster and Diana Fisher
- Everybody Needs a Rock by Byrd Baylor
- Guess Who My Favorite Person Is by Byrd Baylor
- I’m in Charge of Celebrations by Byrd Baylor
- Just a Seed by Wendy Blaxland
- Lewis and Clark, the Adventure in the West by Frank Burd
- Mouse and Mole and the All-Weather Train Ride by Doug Cushman
- My Nature Journal by Adrienne Olmstead
- Salamander Rain: a Lake and Pond Journal by Kristin Pratt-Serafini
- The Lewis and Clark Expedition, Join the Corps of Discovery to Explore Uncharted Territory by Carol A. Johmann
- The Nature Connection, an Outdoor Workbook for Kids, Families, and Classrooms by Clare Walker Leslie
- The Other Way to Listen by Byrd Baylor
- Weather Words and What They Mean by Gail Gibbons
- Where Does the Wind Blow? by Cindy Rink

Nature journal template, [http://www.sierraclub.org/education/nature\\_journal\\_template.pdfv](http://www.sierraclub.org/education/nature_journal_template.pdfv)

### Credits

This field investigation was developed and written by Prairie Wetlands Learning Center Staff, U.S. Fish and Wildlife Service. Thanks to Prairie Science Class naturalist Tia Thysell for reviewing this lesson plan. Thanks to Dave Ellis, Prairie Science Class coordinator, for contributing to this lesson. Thanks to the following teachers for reviewing this lesson plan: Sarah Collins, home school parent/teacher, kindergarten and 2<sup>nd</sup> grade; Renee Larsen, 2<sup>nd</sup> grade, Fergus Falls; Kari Kreft, 2<sup>nd</sup> grade, West Central Area Schools; Vicki Hanneman, 3<sup>rd</sup> grade, Fergus Falls; Dorothy Droll, 5<sup>th</sup> grade, St. Henry’s School, Perham; Stacy Lundquist, Battle Lake, 5<sup>th</sup> and 6<sup>th</sup> grade math and reading; Deb Strege, licensed teacher. Thank you to Mark Baldwin, Director of Education, Roger Tory Peterson Institute of Natural History, Jamestown, New York, for reviewing this lesson.







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## 3<sup>rd</sup> Grade State Standards

Science-

SC 1:

- 5.1.1.a Ask testable scientific questions
- 5.1.1.b Plan and conduct investigations and identify factors that have the potential to impact an investigation
- 5.1.1.c Select and use equipment correctly and accurately
- 5.1.1.d Make relevant observations and measurements
- 5.1.1.e Collect and organize data
- 5.1.1.f Develop a reasonable explanation based on collected data
- 5.1.1.g Share information, procedures, and results with peers and/or adults
- 5.1.1.h Provide feedback on scientific investigations
- 5.1.1.i Use appropriate mathematics in all aspects of scientific inquiry
- 5.1.2.a Recognize that scientific explanations are based on evidence and scientific knowledge.
- 5.1.2.c Recognize many different people study science
- 5.1.3.a Identify a simple problem
- 5.1.3.b Propose a solution to a simple problem
- 5.1.3.c Implement the proposed solution
- 5.1.3.d Evaluate the implementation
- 5.1.3.e Communicate the problem, design, and solution

SC 2:

- 5.2.3.a Recognize that sound is produced from vibrating objects; the sound can be changed by changing the vibration

SC 3:

- 5.3.1.a Compare and contrast characteristics of living and nonliving things
- 5.3.1.b Identify how parts of plants and animals function to meet basic needs (e.g., leg of an insect helps an insect move, root of a plant helps the plant obtain water)
- 5.3.2.b Identify the life cycle of an organism
- 5.3.3.c Recognize the living and nonliving factors that impact the survival of organisms in an ecosystem
- 5.3.3.d Recognize all organisms cause changes, some beneficial and some detrimental, in the environment where they live
- 5.3.4.a Describe adaptations made by plants or animals to survive environmental changes

SC 4:

- 5.4.3.b Observe, measure, and record changes in weather (temperature, wind direction and speed, precipitation)
- 5.4.3.c Recognize the difference between weather, climate, and seasons







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### Language Arts-

LA 3.1.5.b Relate new grade level vocabulary to prior knowledge and use in new situations.

LA 3.2.1.a Use prewriting activities and inquiry tools to generate and organize information (e.g., sketch, brainstorm, web, free write, graphic organizer, storyboarding, and word processing tools)

LA 3.2.1.b Generate a draft by:

- Selecting and organizing ideas relevant to topic, purpose, and genre
- Composing paragraphs with grammatically correct sentences of varying length, and complexity, and type (e.g., declaration, interrogative, and exclamatory)
- Developing paragraphs with topic sentences and supporting facts and details

LA 3.2.2.a Write in a selected genre considering purpose (e.g., inform, entertain, persuade, instruct)

LA 3.2.2.d Apply an organizational structure appropriate to the task (e.g., logical, sequential order)

LA 3.3.1.a Communicate ideas and information in a clear and concise manner appropriate for the purpose and setting (e.g., language, word choice, sequence, relevance)

LA 3.3.2.a Demonstrate listening skills needed for multiple situations and modalities (e.g., electronic, one-to-one, small/large group, presentation)

LA 3.3.2.b Use information in order to complete a task

LA 3.3.2.c Listen, ask questions to clarify, and take notes to ensure accuracy of information

LA 3.3.2.d Listen to and summarize thoughts, ideas, and information being communicated

LA 3.3.3.c Interact and collaborate with others in learning situations by contributing questions, information, opinions, and ideas using a variety of media and formats







## Blair DeSoto Environmental Education Partnership

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# Discovery Hike



**Grade:** 3

**Duration:**  
30-45 minutes

### Supplies

- Students' nature journals
- Pens/pencils
- Optional: hand lenses

### Summary

Nature is full of discoveries for students to make. During a semi-structured hike at DeSoto National Wildlife Refuge, students will use nature as a platform for making discoveries about the natural world.

### Objectives

- Record observations about nature in a journal
- Write personal thoughts about an experience in nature
- Brainstorm and apply categories to guide the discovery hike

### Standards:

Science:

5.1.1.c, 5.1.1.e, 5.1.1.g, 5.1.1.h, 5.3.1.a, 5.3.3.c, 5.4.3.b

Language Arts:

LA 3.2.1a, LA 3.2.2.a, LA 3.2.2.d, LA 3.3.1.a, LA 3.3.2.a, LA 3.3.2.b, LA 3.3.2.c, LA 3.3.2.d

### Procedure

1. Students open to the next blank page in their nature journals and title the page "Discovery Hike."
2. Students write their data line at top of the page including day, time, location and weather. This will help students at the end of the year when they look at trends throughout the year.
3. Ask students how they think we learn about nature. What do you know about nature observation? How could we learn more about nature today?
4. Explain observation and how observation can help us learn all different kinds of things about nature. Illustrate how careful observation over the course of time can help us see patterns we would not have otherwise known existed.
5. Introduce the discovery hike. Today the students will be explorers as we journey together on a discovery hike. During this hike, they will be recording observations in their journals. Explain to the students that we will do discovery hikes in different seasons to see similarities and differences in the seasons.
6. Help students set up the journal page. Divide the page into four







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# Discovery Hike

quadrants. Each quadrant should have a label and these can change depending on what is being studied. Examples include sketch, animals, plants, sound observations, sight observations, smell observations, questions and general observations.

7. The ranger leads the students on a hike to see what they can discover. This is not a silent activity but being quiet can help with observing wildlife. Students are encouraged to record observations as they make them.
8. If desired, a hand lens can be provided to the students to give them an opportunity to look at nature more closely. This is often a good idea because it adds excitement while allowing for closer observation.
9. At the end of the discovery hike, students sit in a circle and share what they discovered. This will allow for the development of public speaking skills as well as reflection on the activity.

### Extensions:

1. Have students write an essay detailing their experiences during their discovery hike. Using nature as an authentic learning environment can help students write descriptively from their own experiences.
2. Repeat the discovery hike near your school. How does it differ from the discovery hike at DeSoto National Wildlife Refuge? How is it the same?





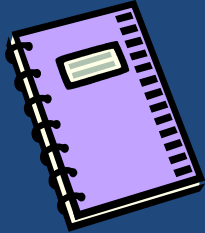


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# Color Map



**Grade: 3**

**Duration:**  
30-45 minutes

**Supplies:**

- Students' nature journals
- Pens/Pencils

### Summary

Colors in nature are vibrant and can be an exciting way for children to starting making observations and connections with the natural world. By using nature as an authentic learning environment, students will learn to observe and record colors.

### Objectives

- Recognize colors and color variations in the outdoor environment
- Record color observations in a journal
- Use careful observations to identify and record subtle color observations not noticed during a quick run through nature

### Standards:

Science:

5.1.1.c, 5.1.1.d, 5.1.1.e, 5.1.1.g

Language Arts:

LA 3.3.2.a, LA 3.3.2.b, LA 3.3.2.c, LA 3.3.2.d, LA 3.3.3.c

### Procedure

1. Students bring nature journals to all outdoor lessons. Students open to the next open page and title the page "Color Map"
2. Students write their data line at the top of the page including day, time, location and weather. This will help students at the end of the year when they look at trends throughout the year.
3. Ask students what colors they often see in nature? What do the colors mean? Are colors different in different natural environments? Do colors in nature vary depending on the season?
4. Have students make color observations about the area around where they are sitting. Encourage students to be more detailed in their descriptions using specific terms or more detailed color descriptions (i.e. Kermit the Frog green, dark brown at the bottom of the tree becoming lighter brown as the tree grows higher). Introduce the idea of different shades of colors and categorizing different shades.
5. Explain the journaling procedure. Students will sit in a location assigned by a teacher quietly to observe and record colors they see.







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# Color Map

The students will put a dot in the middle of their journal page to signal where they are sitting. This will allow them to pinpoint on the journal page where they see each color. There are three options of journaling. Students can use colored pencils to illustrate colors, using descriptive language to describe color differences and shades or they can create a key with a letter code for each color (i.e. DB is dark brown and SY is sand yellow).

6. Take students to the predetermined location. Set them along the trail so they are far enough to not be able to talk to each other comfortable. The length of the observation varies by age group. 15-20 minutes is a good guideline for third grade.
7. When the observation time is complete, gather students in a group to share discoveries. Sharing time is important for solidifying learning and helping students build confidence and public speaking skills.

### Extensions

1. Have students write an essay detailing their experiences during their silent observation. For some students, this silence in nature is a new experience that could lead to really interesting journal entries.
2. Repeat the color map activity near your school. How does it differ from the color map at DeSoto National Wildlife Refuge? How is it the same?







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# Sound Map



**Grade: 3**

**Duration**  
30-45 minutes

### Supplies

- Students' Nature Journals
- Pens/Pencils

### Summary

Recognizing, categorizing and describing sounds are essential skills for child development. By using nature as an authentic learning environment, students will learn to observe, record and identify sounds.

### Objectives

By the end of this lesson, students will be able to:

- Recognize natural and unnatural sounds in the outdoor environment
- Record sound observations in a journal
- Identify the location and direction of sounds through careful observation
- Categorize and describe sounds

### Standards:

Science:

5.1.1.d, 5.1.1.e, 5.1.1.g, 5.2.3.a

Language Arts:

LA 3.2.1a, LA 3.3.1.a, LA 3.3.2.a, LA 3.3.2.c, LA 3.3.2.d, LA 3.3.3.c

### Procedure

1. Students open to the next page in their nature journals and title the page "Sound Map."
2. Students write their data line at the top of the page including day, time, and weather. This will help students at the end of the year when they look at trends throughout the year.
3. Ask students if they hear a lot of sounds in their neighborhoods. What sounds are most common? What natural sounds do you hear the most? What would you like to hear? How do you think you could hear more sounds?
4. Have students sit quietly during the introduction for one minute with their eyes close and count on their fingers all the natural sounds they hear. At the end of the quiet time, have students share their observations.
5. Explain the journaling procedure. Students will sit in a location assigned by a teacher quietly to observe and record sounds they hear. The students will put a dot in the middle of their journal page to signify where they are sitting. This will allow them to pinpoint on the journal page where they hear the sounds coming from. They are encouraged to draw lines if the sound is moving to illustrate the location and direction







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# Sound Map

of the movement. Students will record sounds until time is called.

6. Take students to the predetermined location. Set them along the trail so they are far enough to not be able to talk to each other comfortably. This activity is best done in complete human silence. The length of the observation varies by age group. 15-20 minutes is a good guideline for third grade.
7. When the observation time is complete, gather students in a group to share discoveries. Sharing time is important for solidifying learning and helping students build confidence and speaking skills.

### Extensions:

1. Have students write an essay detailing their experiences during their silent observation. For some students, this silence in nature is a new experience that could lead to really interesting journal entries.
2. Repeat the sound map activity near your school. How does it differ from the sound map at DeSoto National Wildlife Refuge. How is it the same?







# Fall Migratory Bird Exploration



**Grade: 3**

**Duration**

**60-75 minutes**

**Supplies**

- Students' Nature Journals
- Pens/Pencils
- Binoculars
- Spotting scopes
- Bus

## Summary

No occurrence in the Missouri River valley better symbolizes the change in seasons than the bird migration in the fall and spring. Birds are easily seen during migration and will provide a context for young students to begin to develop wildlife observation skills and recognize that nature changes throughout the seasons.

## Objectives

By the end of this lesson, students will be able to:

- Use binoculars and other tools to view migratory birds
- Record and sketch observations of migratory birds in nature journals
- Demonstrate listening and observation skills

## Standards

Science:

5.1.1.c, 5.1.1.d, 5.1.1.e, 5.3.3.d, 5.3.4.a, 5.4.3.b, 5.4.3.c

Language Arts:

LA 3.1.5.b, LA 3.3.1.a, LA 3.3.2.b, LA 3.3.2.c, LA 3.3.3.c

## Procedure

1. Students bring nature journals to all outdoor lessons. Students open to the next blank page and title it "Fall Migratory Bird Exploration."
2. Students listen to a short presentation about migration. Introduce the concept of migration and why it might be important for birds to migrate in the spring and fall. Students make connections between bird migration and a road trip. Birds need a resting and feeding spot for migration such as national wildlife refuges like we need a hotel and restaurant during a trip.
3. Instruct students how to set up the journal page. Complete the weather data line.
4. Demonstrate proper techniques for how to use binoculars. Have students practice bring binoculars to their faces while keeping view of an object in the distance.
5. Demonstrate proper spotting scope techniques and explain that the leaders will set up the scopes and they will look through them.
6. Explain to students that detailed journal descriptions are important as







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# Fall Migratory Bird Exploration

we will try to match the descriptions to a bird guide at the end of the lesson today. Explain that students will be expected to sketch and describe four different bird species.

7. Observe birds from viewing gallery at visitor center.
8. Load bus and head out to observe migratory birds.
9. Over the course of two or three stops, students should be able to view a variety of migratory birds to possibly include mallards, northern pintail, green wing teal, pelicans, bald eagles and other species. For this lesson, focus should be on observing bird behavior and colors and not identifying the species.
10. Provide students with a simple bird guide with 6-8 species seen in the area recently. Have them try to match up their sketches and descriptions with the birds on the guide.
11. Allow focused time on the bus for students to record observations in their journals.







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# “Reading the Land” Winter Exploration



**Grade: 3**

**Duration**  
**60-75 minutes**

### Supplies

- Students’ Nature Journals
- Pens/Pencils

### Summary

Using an excerpt of Aldo Leopold’s The Sand County Almanac students explore the winter environment and search for signs of animals. Students will learn to “read the land” for clues as to animal movements and winter survival strategies.

January Thaw

By Aldo Leopold

“Each year after the midwinter blizzards, there comes a night of thaw when the tinkle of dripping water is heard in the land. It brings strange stirrings, not only to creatures abed for the night, but to some who have been asleep for the winter. The hibernating skunk, curled up in his deep den, uncurls himself and ventures forth to prowl the wet world, dragging his belly in the snow. His track marks one of the earliest datable events in the cycle of beginnings and ceasings which we call a year.

The track is likely to display an indifference to mundane affairs uncommon at other seasons; it leads straight across-country, as if its maker had hitched his wagon to a star and dropped the reins. I follow, curious to deduce his state of mind and appetite, and destination if any.

January observation can be almost as simple and peaceful as snow, and almost as continuous as cold. There is time not only to see who has done what, but to speculate why.”

### Objectives

By the end of this lesson, students will be able to:

- Use their senses to explore the winter environment
- Document discoveries in a nature journal
- Observe evidence of animals in winter and make guesses as to what the animals were doing

### Standards:

Science:

5.1.1.c, 5.1.1.d, 5.1.1.e, 5.1.1.g, 5.3.3.c, 5.3.3.d, 5.3.4.a, 5.3.4.b, 5.4.3.a  
LA 3.2.1.a, LA 3.3.1.a, LA 3.3.2.b, LA 3.3.2.c, LA 3.3.2.d, LA 3.3.3.c







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# “Reading the Land” Winter Exploration

## Procedure

1. Welcome students back to DeSoto National Wildlife Refuge. Have them open their journals to the next blank page.
2. Explain what we are going to do outside today to observe animals and animal signs in winter.
3. Winter allows us to come up with the stories of the animal tracks. It will allow us to make guesses about what the animal was doing, where it was going and why. The snow pack allows for a record on animal movements that gives us a better way to observe animal movements than other times of year.
4. Complete the weather data line for the journal entry.
5. Discuss with the students the three ways that animals survive the winter (migration, hibernation and adaptation). Have them think about what signs of animals we might see outside in the winter snow today.
6. Head outside to explore the winter environment. If you find good animal tracks, follow them across country to try and figure out where they are going.
7. Make observations of any signs of animals you see. Remind students to record these observation in their journals. Let nature be your guide and follow clues that you and your group see.
8. Lead a wrap up discussion that brings together observations made by the students and how animals survive the winter at DeSoto National Wildlife Refuge.





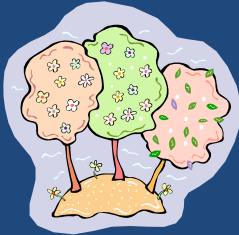


## Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



# Spring Exploration



**Grade: 3**

**Duration**  
**60-75 minutes**

### Supplies

- Nature journals
- Buckets
- Nets
- Viewing jars
- Key to Life in the Pond Guides
- Spoons

### Summary

Spring is a time of new discoveries. During this wetland investigation, students will explore aquatic macroinvertebrates. Aquatic macroinvertebrates help show a window on the diversity of wetland habitats and help students understand life cycles.

### Objectives

By the end of this lesson, students will be able to:

- Make careful observation about the natural world
- Use environmental as a context for descriptive and reflective writing
- Students map a certain area based on its color and sounds, applying observation skills.

### Standards

Science:

5.1.1.c, 5.1.1.d, 5.1.1.e, 5.3.1.a, 5.3.1.b, 5.3.2.b, 5.3.3.c, 5.3.3.d, 5.3.4.a, 5.4.3.d

Language Arts:

LA 3.1.5.b, LA 3.3.1.a, LA 3.3.2.b, LA 3.3.2.c, LA 3.3.2.d, LA 3.3.3.c

### Procedure

1. Meet the bus at the Wood Duck Pond Trail. Lead a discussion about what wetlands are, how to identify aquatic invertebrates, life cycles of aquatic critters and why wetlands are important to those life cycles.
2. Set up a journal page for students to document 4 critters seen during the wetland investigation.
3. Divide the students into groups of 2 or 3. Make sure each group gets a net, tray, spoon, viewer, and key. Demonstrate how to use both the nets and the viewer.
4. Set parameter for investigation area.
5. Encourage students to take a close look at every bucket to see if they can spot smaller critters. Encourage patience in the observations as this can lead to the best observations.







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# Spring Exploration

5. The refuge staff person and teachers will circulate during the investigation time. The students will use field guides to identify invertebrates.
6. Encourage the students to carefully identify the invertebrates and count the number of species identified as part of the wrap up discussion.
7. Have students clean out equipment, hike back to parking lot and return the equipment.
8. Wrap up session questions:
  - What macroinvertebrates did your group identify today?
  - Based on what you have learned, why are wetlands important to animal life cycles?
  - What are some ways national wildlife refuges protect wildlife?







# Blair DeSoto Environmental Education Partnership

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## 5<sup>th</sup> Grade State Standards

### Science-

#### SC 1:

- 5.1.1.a Ask testable scientific questions
- 5.1.1.b Plan and conduct investigations and identify factors that have the potential to impact an investigation
- 5.1.1.c Select and use equipment correctly and accurately
- 5.1.1.d Make relevant observations and measurements
- 5.1.1.e Collect and organize data
- 5.1.1.f Develop a reasonable explanation based on collected data
- 5.1.1.g Share information, procedures, and results with peers and/or adults
- 5.1.1.h Provide feedback on scientific investigations
- 5.1.1.i Use appropriate mathematics in all aspects of scientific inquiry
- 5.1.2.a Recognize that scientific explanations are based on evidence and scientific knowledge
- 5.1.2.c Recognize many different people study science
- 5.1.3.a Identify a simple problem
- 5.1.3.b Propose a solution to a simple problem
- 5.1.3.c Implement the proposed solution
- 5.1.3.d Evaluate the implementation
- 5.1.3.e Communicate the problem, design, and solution

#### SC 2:

- 5.2.1.c Use appropriate metric measurements to describe physical properties

#### SC 3:

- 5.3.1.a Compare and contrast characteristics of living and nonliving things
- 5.3.1.b Identify how parts of plants and animals function to meet basic needs (e.g., leg of an insect helps an insect move, root of a plant helps the plant obtain water)
- 5.3.2.b Identify the life cycle of an organism
- 5.3.3.a Diagram and explain a simple food chain beginning with the Sun
- 5.3.3.b Identify the role of producers, consumers, and decomposers in an ecosystem
- 5.3.3.c Recognize the living and nonliving factors that impact the survival of organisms in an ecosystem
- 5.3.3.d Recognize all organisms cause changes, some beneficial and some detrimental, in the environment where they live
- 5.3.4.a Describe adaptations made by plants or animals to survive environmental changes

#### SC 4:

- 5.4.3.b Observe, measure, and record changes in weather (temperature, wind direction and speed, precipitation)
- 5.4.3.c Recognize the difference between weather, climate, and seasons
- 5.4.4.a Describe how slow processes (erosion, weathering, deposition) and rapid processes (landslides, volcanic eruptions, earthquakes) change Earth's surface

### Language Arts-

- LA 5.2.1.a Use prewriting activities and inquiry tools to generate and organize information, guide writing, and answer questions (e.g., sketch, brainstorm, map, outline, diagram, free write, graphic organizer, digital idea)







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mapping tool)

LA 5.2.2.a Write in a selected genre considering purposes (e.g., inform, entertain, persuade, instruct)

LA 5.2.2.b Write to a specified audience considering interesting, background knowledge, and expectations (e.g., known or unknown individual, business, organization)

LA 5.2.2.c Write considering tone/voice and typical characteristics of a selected genre (e.g., memoir, biography, report, persuasive letter, poem, essay)

LA 5.3.1.a Communicate ideas and information in a manner appropriate for the purpose and setting

LA 5.3.2.a Demonstrate listening skills needed for multiple situations and modalities (e.g., video, audio, distance, one-to-one, group)

LA 5.3.2.b Listen and ask questions to clarify, and take notes to ensure accuracy of information

LA 5.3.2.c Listen to, summarize and interpret message and purpose of information being communicated

LA 5.3.3.b Apply conversation strategies (e.g., face the speaker, listen while others are talking, gain the floor, eye contact, tone, stay on topic, non-verbal cues)

LA 5.3.3.c Interact and collaborate with others in learning situations by contributing questions, information, opinions, and idea using a variety of media and formats







## Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



# Sense of Wonder



**Grade:** 5

**Duration:** 90-120  
minutes

### Supplies

- Student journals
- Sense of Wonder book

**This lesson is adapted from a field investigation lesson at Prairie Wetlands Learning Center in Fergus Falls, Minnesota.**

### Summary

Students are introduced to naturalists as scientists and to author Rachel Carson as one example of a naturalist. Students listen to an excerpt from a book by Rachel Carson called The Sense of Wonder. Then, using a data collection sheet, students go into the field to search for wonder. Afterwards, they share their discoveries and draw conclusions.

### Objectives

By the end of this lesson, students will be able to:

- Identify naturalists as one type of scientist
- Describe three things a naturalist does (observe nature, record data, share discoveries with others)
- List three qualities of naturalists (quiet, prepared, full of questions and wonder, in the moment, sharing, curious, respectful, observant, and patient)
- Search for and find wonder (such as beauty, surprise, awe, delight, joy) in the prairie
- Practice being naturalists and consider the possibility that they are naturalists
- Identify and enjoy the prairie as one place for exploration and exploring as a positive choice or activity

### Standards

Science:

5.1.1.b, 5.1.1.d, 5.1.1.e, 5.1.1.g, 5.4.3.b, 5.4.3.c

Language Arts:

LA 5.2.1.a, 5.2.2.b, 5.3.1.a, 5.3.2.b, 5.3.2.c

### Procedure

1. Ask students to tell you what a naturalist is. What kind of job is that? (scientist)
2. What does a naturalist do? (observes nature, writes things down, shares







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# Sense of Wonder

discoveries with others) Record their answers on the white board as students record them in their notebooks. Are *they* naturalists?

3. Ask students to tell you the qualities of a naturalist. How does a naturalist behave outside? Record a list on the white board and fill in any qualities they may have missed. A completed list included prepared, quiet, observant, patient, curious, respectful, full of wonder, inquisitive, in the moment, and sharing. Students should also record this list in their notebooks.
4. Briefly introduce Rachel Carson as a naturalist author.
5. Set up a T-chart with the students to discuss the two kinds or definitions of wonder. Use student response to fill in both sides of the chart. Ask for examples of wonder questions for the left side of the chart (I wonder what's for dinner? I wonder what we're doing in science tomorrow?) Ask for examples of amazing things for the wonder-amazing side of the chart (Joe Mauer when he hits a homerun, my mother, a loon, a sunrise...)
6. Start a wonder word list for continuation during the reading. Wonder words are synonyms for "wonder" such as beauty, surprise and mystery.
7. Read the night sky section of The Sense of Wonder. See section, "Excerpt from The Sense of Wonder." Ask students to jot down any wonder words they hear; individual words which are synonyms for "wonder."
8. Invite students to join you on a search for wonder outside. Help them prepare their journal. At the top of their investigation page, they should write the title "Sense of Wonder." Be sure to include the date and the location. On the white board, model what their data sheet will look like by dividing the page into quadrants. Allow them to choose four wonder word from a list (such as joy, mystery, thrill, excitement, love, awe, surprise, beauty, delight) and title each quadrant with one of the four words. Instruct the students that they can write and/or sketch and label examples of those kinds of wonder in each quadrant.
9. Remind everyone that they are naturalists and should practice being naturalists in the field. How should they behave? (quiet, observant, patient, etc.) Allow for as much time as possible in the field. Move from group to group to answer questions, model good naturalist behavior, and remind students to record their wonder on their investigation sheets.
10. During outdoor time (which should be an hour or more), have students sit quietly and still for up to 15 minutes to observe nature. Space them about five meters apart from each other along a section of trail. This allows for personal reflection and a more intimate experience in nature without interference from







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# Sense of Wonder

classmates.

11. Wrap up by asking a few students to share the wonder they found with the class. Reread the first paragraph of the excerpt and ask students to free write on their experience. (What if I never saw this before? What if I knew I would never see it again?). Ask a few students to share with the class. How can they be more open to sensing wonder? Ask them how or who they could share this discovery with when they return home? ( Does your sense of wonder end when you leave? Encourage them to keep going outside anywhere they are to search for wonder; it is free and is a good, healthy choice of activity.







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# Sense of Wonder

## Excerpt from The Sense of Wonder by Rachel Carson

“Exploring nature....is largely a matter of becoming receptive to what lies all around you. It is learning again to use your eyes, ears, nostrils and finger tips, using your senses. For most of us, knowledge of our world comes largely through sight, yet we look about with such unseeing eyes that we are partially blind. One way to open your eyes to unnoticed beauty is to ask yourself. ‘What if I had never seen this before? What if I knew I would never see it again?’

“I remember a summer night when such a thought came to me strongly. It was a clear night without a moon. With a friend, I went out on a flat headland that is almost a tiny island, being all but surrounded by the waters of the bay. There the horizons are remote and distant rims on the edge of space. We lay and looked up at the sky and the millions of stars that blazed in the darkness. The night was so still that we could hear the buoy on the ledges out beyond the mouth of the bay. Once or twice a word spoken by someone on the far shore was carried across on the clean air. A few lights burned in cottages. Otherwise there was no reminder of other human life; my companion and I were alone with the stars. I have never seen them more beautiful: the misty river of the Milky Way flowing across the sky, the patterns of the constellations standing out bright and clear, a blazing planet low on the horizon. Once or twice a meteor burned its way into the earth’s atmosphere.

“It occurred to me that if this were a sight that could be seen only once in a century or even once in a human generation, this little headland would be thronged with spectators. But it can be seen many scores of nights in any years, and so the lights burned in cottages and the inhabitants probably gave not a thought to the beauty overhead; and because they could see it almost any night perhaps they will never see it.

“An experience like that, when one’s thoughts are released to roam through the lonely spaces of the universe, can be shared .....even if you don’t know the name of a single star. You can still drink in the beauty, and think and wonder at the meaning of what you see.”





# Sense of Wonder

Sketches: and Notes:

## Nature Journal Entry

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Location: \_\_\_\_\_

Weather Conditions: \_\_\_\_\_

Cloud Coverage (Circle One):

Cirrus (wispy) Cumulus (puffy clouds) Stratus

(dense and layered) Cumulous

(Thunderclouds)

Est. Temp. \_\_\_\_\_ Actual Temp. \_\_\_\_\_

Est. Wind Dir. & Speed: \_\_\_\_\_

Actual Wind Dir. & Speed: \_\_\_\_\_

Colors of the Day:

Beauty 4+

Awesome 4+

Surprise 4+

Big Question 4+

I now know:

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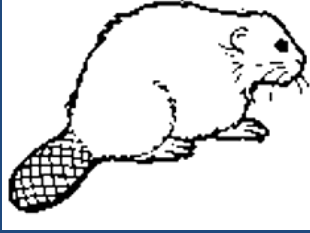


## Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



# Beavers



**Grade:** 5

**Duration:** 90-120 minutes

### Supplies

- Build a Beaver Activity Box
- Microphone
- Beaver Fur
- Beaver Tail
- Beaver-chewed log



### Summary

Beavers will be the central focus of this outdoor classroom experience. The focus will be on the adaptations of beavers, how beavers affect their environment and how they use their adaptations to survive and thrive. This will enable students to make connections with the bigger picture of the ecosystem by thinking about how one animal behaves and survives. The beavers are also used as an example of human/wildlife interactions and what constitutes a good habitat for different species.

### Objectives

By the end of this lesson, students will be able to:

- Recognize and explain, citing two reasons whether downed trees were felled by beavers or by another natural/human force
- Illustrate how five or more adaptations help beavers survive in their environment
- Plan an investigation of a beaver site using three or more different investigation techniques (sight, sound, touch, scat, trails, etc.)
- Make two predictions about how beavers moving into an area would affect the landscape
- Appraise, citing two examples, whether a site has been habitat for beavers or not

### Standards

Science:

5.1.1.a, 5.1.1.b, 5.1.1.d, 5.1.1.e, 5.1.1.f, 5.1.1.g, 5.1.2.a, 5.2.1.c, 5.3.1.b, 5.3.3.c, 5.3.3.d, 5.3.4.a, 5.4.3.b, 5.4.3.c

Language Arts:

LA 5.2.1.a, 5.2.2.a, 5.3.1.a, 5.3.2.b, 5.3.2.c, 5.3.3.b

### Procedure

1. Discussion of DeSoto National Wildlife Refuge and where beavers may be present there.
2. Build a Beaver activity—from Jacksonville State University Field Schools (supplies are kept by 5th grade teachers at Arbor Park School). This lesson incorporates class participation, questions, and critical thinking. The refuge staff person asks for a volunteer for the human beaver and has them stand on the picnic table. Then students are asked







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*Blair Community Schools and DeSoto National Wildlife Refuge*



# Beavers

to name adaptations that beavers have on their bodies to help them survive and what these adaptations are used for. Each adaptation is represented with an item for the human beaver to wear. Instructions for each adaptation are found on the information sheet from Jacksonville State. This role-play activity helps the students visualize beaver adaptations and they will use the knowledge of those adaptations during their investigation later in the morning.

3. Travel to an area with beaver activity (pre-scouted location) and give students an introduction about the group investigation. It helps to talk about it like CSI (Crime Scene Investigation TV show) to add excitement to the process. Start by going through a simple investigation with the group by leading them through some questions about a particular site. Help them to form a hypothesis on what activity may have been in the area. This who, what, when, where, why, and how format will help the students organize their investigation and help them focus on the important factors they will present. Students are then divided into groups, given parameters of a search area, and are sent out to find a place where beavers have been active.
4. The groups come together and travel from site to site where the student groups present the findings of their investigations. Refuge staff and teachers ask questions of the group to allow for them to further show their knowledge and to clarify their thinking. A microphone will be used and all students will be required to give a portion of the presentation. This will allow for the students to apply the information they have learned about beaver adaptations to a real life setting, propose a hypothesis about what they think happened at their site and why, and practice speaking in front of an audience.
5. The students will gather around again for a summary and review of what they learned. The refuge staff person will lead the discussion which will address the following:
  - What adaptations do beavers have to help them survive in their environment?
  - How can you tell if a beaver felled a tree and that it didn't fall from another cause?
  - How would you tell your friends and family if beavers have been active in an area?
  - How have beavers changed this environment and who benefits from that change?

The answers to these questions will provide feedback to the refuge staff person and the teachers as to what the students learned and maybe what areas could use more attention in the future.





# Beaver Scene

Beaver Scene Investigation Sketches and  
Notes:

## Investigation (BSI)

## Nature Journal Entry

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Location: \_\_\_\_\_

Weather Conditions: \_\_\_\_\_

Cloud Coverage (Circle One):

Cirrus (wispy) Cumulus (puffy clouds) Stratus

(dense and layered) Cumulous (Thunderclouds)

Est. Temp. \_\_\_\_\_ Actual Temp. \_\_\_\_\_

Est. Wind Dir. & Speed: \_\_\_\_\_

Actual Wind Dir. & Speed: \_\_\_\_\_

Colors of the Day:

Beaver Adaptation Sketches: and Notes:

I now know:

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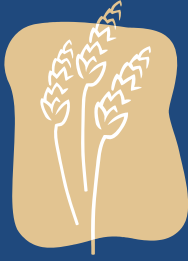


## Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



# Native Prairie Exploration



**Grade:** 5

**Duration:** 90-120 minutes

### Supplies

- Student journals
- Prairie Flower Guides
- Measuring stick
- Cameras

### Summary

Native prairie is a vibrant and disappearing ecosystem. In Nebraska, less than one percent of the native prairie remains. This ecosystem is home to many native plants and animals and plays an important role in the life cycles of many migratory birds. In this lesson, student will make discoveries about the prairie at DeSoto National Wildlife Refuge.

### Objectives

By the end of this lesson, students will be able to:

- Identify four grasses and two flowers
- Sketch characteristics of flowers and grasses looking for details
- Use sense to help identify characteristics of grasses and flower including sight, feel and smell

### Standards

Science:

5.1.1.b, 5.1.1.c, 5.1.1.d, 5.1.1.e, 5.3.1.a, 5.3.1.b, 5.3.3.c, 5.3.3.d, 5.3.4.a, 5.4.3.b, 5.4.3.c

Language Arts:

LA 5.2.1.a, 5.2.2.a, 5.2.2.b, 5.3.1.a, 5.3.2.a, 5.3.2.b, 5.3.3.b, 5.3.3.c

### Procedure

1. Greet students at north hunter parking lot and ask them what they know about native prairie.
2. Present short talk (5 minutes) about native prairies and the prairie ecosystem. Emphasize plant and animals adaptations to the native.
3. Introduce the field investigation for the day to the students. Students will be in small groups and expected to complete the scavenger hunt. Students will search for different grasses and forbs and identify them guiding the guides given.
4. Complete group work and journal entries. Bring examples back to show the group.
5. Come back together as a group and discuss discoveries. Ask students about plant characteristics they observed.





# Native Grasses and Native Flowers Nature Journal Entry

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Location: \_\_\_\_\_

Weather Conditions: \_\_\_\_\_

Cloud Coverage (Circle One):

Cirrus (wispy) Cumulus (puffy clouds) Stratus  
(dense and layered) Cumulous (Thunderclouds)

Est. Temp. \_\_\_\_\_ Actual Temp. \_\_\_\_\_

Est. Wind Dir. & Speed: \_\_\_\_\_

Actual Wind Dir. & Speed: \_\_\_\_\_

Colors of the Day:

Native Grasses Sketches: and Notes:

Native Flowers Sketches and Notes:

I now know:

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# Bird Migration and Wetlands

**Grade:** 5

**Duration:** 90-120  
minutes

## Supplies

- Student journals
- Binoculars
- Birds of Nebraska field guides
- Project Wild Aquatic Wetland Metaphors Lesson
- Wetland Metaphors items

## Summary

DeSoto National Wildlife Refuge was established in 1958 as a sanctuary for migratory birds. In the spring and fall, DeSoto's wetlands host migratory bird population that use the refuge for resting and feeding. Refuge management aims to create conditions that allow the migratory birds to get the food and rest they need to complete their migration.

## Objectives

By the end of this lesson, students will be able to:

- Use binoculars and other tools to view migratory birds
- Record and sketch observations of migratory birds in nature journals
- Demonstrate listening and observation skills
- Recognize the importance of wetlands for migratory birds
- Correctly identify birds using a field guide

## Standards

Science:

5.1.1.a, 5.1.1.b, 5.1.1.d, 5.1.1.e, 5.1.2.a, 5.3.1.b, 5.3.3.c, 5.3.3.d, 5.3.4.b

Language Arts:

LA 5.2.2.b, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.d

## Procedure

1. Gather students in the auditorium and ask what they know about the fall migration at DeSoto. Ask what role wetlands play in the migration.
2. Use Project Wild Aquatic lesson "Wetland Metaphors" (page 39) to discuss the importance of wetlands to migratory birds.
3. Fill in journal page weather data and location information. Explain to students that they will be observing the fall migration and journaling about bird they see and the wetland habitat characteristics of where they see the birds.
4. Divide into groups of two, hand out binoculars and give a quick tutorial on how to focus and use them.
5. Hand out bird books and explain how to use them to identify bird by color.







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# Bird Migration and Wetlands

6. Allow the students time to look at the migratory birds and explore the viewing gallery area at their own pace. If students aren't journaling, remind them that they are responsible for documenting their observations. Keep checking the spotting scopes to ensure they are pointing towards birds. They are easily bumped by excited students. This indoor area is used because the building acts as a viewing blind and allows the students a good chance to identify and study birds up close without flushing them from their positions.

7. Depending on the time available and what was seen from the viewing gallery windows, either take a bus tour of the refuge to see more birds or take a nature hike through the prairie to listen for and documents migrating song birds. It is important to save time for outdoor investigation as this will give students a chance to experience the bird migration in the elements.

8. The students will gather around again for a summary and review of what they learned. The refuge staff person will lead the discussion which will address the following:

- What types of species were you able to identify? How many?
- Why are wetlands important to migratory birds?
- What role does the refuge play in protecting wetlands for migratory birds?

The answers to these questions will provide feedback to the refuge staff person and the teachers as to what the students learned and maybe what areas could use more attention in the future.







## Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



# Tracking/Birding



**Grade:** 5

**Duration:** 90-120  
minutes

### Supplies

- Bird biologist activity sheet from Fish and Wildlife Service migratory bird education manual
- Birds of Nebraska field guide
- Animal tracks field guide

### Summary

Tracking animals in the winter provides an exciting way for students to learn about direct and indirect observations and data collection methods. Winter is a time that students do not naturally think about going outside so this is a good time for students to see that nature does not have a season. Development of observation skills is the key to successful scientific inquiry and investigations. This lesson uses winter and animal tracking as a way to increase students' awareness and helps them formulate better observations by using nature as the subject.

### Objectives

By the end of this lesson, students will be able to:

- Identify two animal tracks and explain their motion of travel.
- Use a field guide to identify three bird species and record observations of the species on an activity sheet.
- Analyze track spacing and frequency to determine if there are patterns.
- Explain three ways national wildlife refuges help protect wildlife.

### Standards

Science:

5.1.1.a, 5.1.1.c, 5.1.1.d, 5.1.1.e, 5.1.1.g, 5.3.1.b, 5.3.4.a, 5.4.3.b

Language Arts:

LA 5.2.1.a, 5.3.1.a, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.b, 5.3.3.c

### Procedure

1. Meet teachers at the door. The students should be divided into two groups. Group A goes to the large viewing gallery and Group B goes to the auditorium.
2. Tracking
  - Observing animal signs inside—what to look for. Large viewing gallery. (10 min)
  - Observing animal tracks outside with guides around visitor center. (30-45 minutes, depending on the weather)
  - Draw observations of animal tracks using stamps, rubbings, field guides, etc. Multipurpose room. (15-30 minutes depending on time outside)







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# Tracking/Birding

- Wrap up and sharing in the multipurpose room. (5 minutes)
3. Birding
- How to use binoculars and Birds of Nebraska field guide. Auditorium. (15 minutes)
  - Bird watching with activity sheets. Small viewing gallery. (45 minutes)
  - Complete 1-2 bird activity sheets. Work in pairs.
  - Wrap-up and sharing of discoveries. Auditorium. (15 minutes)





# Tracking and Bird Study Nature Journal Entry

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Location: \_\_\_\_\_

Weather Conditions: \_\_\_\_\_

Cloud Coverage (Circle One):

Cirrus (wispy) Cumulus (puffy clouds) Stratus  
(dense and layered) Cumulous (Thunderclouds)

Est. Temp. \_\_\_\_\_ Actual Temp. \_\_\_\_\_

Est. Wind Dir. & Speed: \_\_\_\_\_

Actual Wind Dir. & Speed: \_\_\_\_\_

Colors of the Day:

Tracking Sketches: and Notes:

Birds Sketches and Notes:

Post Trip

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# Bird Watching

**Name:**

**Location:** Desoto National Wildlife Refuge Visitors' Center

**Name of Bird:**

**Size: As big as a:**

Sparrow

Robin

Crow

Hawk

Eagle

**Habitat Specific Location:**

Ground

Tree Trunk

Branch

In the Air Feeder

**Behaviors seen:**

Flying

Drinking

Bathing

Feeding

Hopping

Perching

Walking

Other

**Choose two behaviors and explain what the bird was doing and why.**

**Behavior Explanation 1.**

**Behavior Explanation 2.**

**Interesting Fact from Stan's notes:**

**Drawing:**





## Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



# Bald Eagles



**Grade:** 5

**Duration:** 90-120 minutes

### Supplies

- Eagle wing span poster
- Bald eagle mount
- Eagle skull
- Turkey feathers
- Talon
- Eagle photo book
- Tape of eagle call
- Binoculars
- Spotting scope
- Branch from eagles' nest
- Students' nature journals
- Pens/pencils
- Bus

### Summary

The bald eagle will be the primary focus of this field trip. While learning about the eagle, students will explore larger concepts like predator/prey relationships, habitat issues, and endangered species and recovery. Bald eagles are a great illustration of how species can become endangered, what happens once they are listed on the endangered species list, and how recovery is possible

### Objectives

By the end of this lesson, students will be able to:

- Explain four characteristics of a bald eagle that makes it a successful predator.
- Illustrate the reason why the bald eagle became an endangered species and two reasons why bald eagles recovered.
- Distinguish between what is and what isn't good habitat for nesting bald eagles.
- Plan and conduct an investigation into a question of their own choosing about bald eagles.
- Explain three ways national wildlife refuges help protect wildlife.

### Standards

Science:

5.1.1.a, 5.1.1.c, 5.1.1.d, 5.3.1.b, 5.3.3.c, 5.3.3.d, 5.3.4.a, 5.4.3.c

Language Arts:

LA 5.2.1.a, 5.2.2.b, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.b, 5.3.3.c

### Procedure

1. Meet at DeSoto Visitor Center, hallway near the bald eagle for discussion of bald eagle adaptations that contribute to the bald eagle being a good predator. See attached sheet for adaptations program.
2. Students are divided into groups of five. All students have a journal and as a group they work out an investigation from the outdoor portion of the lesson. Students will use the KWOL (Know, Wonder, Observed, and Learned) method to organize their investigation and each group should agree upon one question to be the focus of their investigation and each group should agree upon one question to be the focus of **their**







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# Bald Eagles

investigation while outside.

3. Students are handed out binoculars and the refuge staff person gives a short lesson on proper binocular use.
4. Load bus for refuge tour, look for eagles, stop at Missouri River Overlook. This outdoor section of the field trip is where students get the opportunity to see bald eagles in their environment. Being flexible and being able to recognize teachable moment is crucial in the success of this part of the program. Refuge staff should have scouted the refuge in the days leading up to the trip to determine locations where bald eagles are often found. Since this is not a busy time of year at the refuge, the bus can stop on the road when eagles are spotted. The staff person gets off first, sets up the spotting scope and then students come out in groups of 10. Before they get off the bus remind them of being quiet and respecting wildlife. This outdoor time is also when the groups will use their observation skills to make observations related to their KWOL investigation question.
5. Bus stops at Bob Starr Overlook. Refuge staff member leads group on a short hike to the eagles' nest and discusses nesting and nest locations. Students are asked to sketch the area of the eagles' nest and the surrounding area to determine why the area was chosen by the eagles for the nest. Students also use this time to continue working on KWOL questions.
6. Group wrap-up session. This will be a time to discuss what birds were seen throughout the day, discuss the eagles' nest site and go over KWOL group investigations.
  - What adaptations make bald eagles successful predators?
  - Why did bald eagles become endangered and why did they recover?
  - What makes the nest site of the bald eagles so attractive to them?
  - What is something new you learned about bald eagles after going on the refuge tour today?
  - How does DeSoto National Wildlife Refuge help protect bald eagles?

## Bald Eagles: Adapted for Being Good Predators

*Theme: As a predator, bald eagles have a variety of adaptations to be successful hunters.*

Beak: (prop: eagle skull)

Curved, sharp, serrated for tearing (like a steak knife). They eat smaller prey whole and regurgitate (vomit) the inedible parts.

Eyes: (prop: eagle skull)

2-4X better than human eyes. Can see a rabbit in a meadow from a mile away. Clear eyelids protect eyes which can be closed to prevent water in while still allowing the eagle to see. Orientated toward the front on both sides of head for better visibility. Have two centers to focus, one to the front and one to the side, allowing for a bigger range of vision. Fixed in the socket, have to turn whole head. (Have kids watch something moving) can rotate head in 3/4 circle (have kids rotate head)







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Wings: (*prop: drawing of wings*)

7-8 feet long, wide for gliding/soaring

Flight: bald eagles are powerful fliers who can reach speeds of up to 100 mph during a dive. Average flight speeds are about 20 to 40 mph. They can soar for hours on end.

Feathers: (*prop: turkey feathers*)

More than 7,000 feathers. Down feathers are soft for warmth, flight feathers are stiff for swooping and soaring.

Bones (*prop: turkey feathers*)

Hollow, light-weight. Skeleton weights about half a pound (250-300 grams), and is only 5 or 6% of the eagle's total weight. The feathers weight twice that much. The beak, talons, and feathers are made of keratin.

Legs (*prop: book photo*)

Strong muscles for grabbing. They have a well defined sense of touch used for hunting.

Toes (feet):

Large—size of an adult human hand. Used for gripping and crushing. 3 forward toes, 1 backward facing.

Talons: (*prop: talon*)

Sharp for grasping and piercing.

Other:

Birds of Prey (Raptor): curved beak and sharp talons (hawks, eagles, falcons, owls, etc. all raptors)

Weight: 10-13 lbs (Females are larger than males)

Live 30 or more years in the wild

Nests: can reach 10 feet across and weight up to 2,000 pounds. They lay 1-3 eggs, incubate for 35 days

Food: Eagles need to eat 6-11% of their body weight every day. This would mean an average 5th grader would have to eat 21,000 calories to keep this ratio. That's 16 frozen Jack's pepperoni pizzas in one day. No wonder they can eat an entire goose.

Eagle calls (*prop: tape player*)





# Bald Eagle

Bald Eagle in the Wild Sketches and Notes:

## Nature Journal Entry

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Location: \_\_\_\_\_

Weather Conditions: \_\_\_\_\_

Cloud Coverage (Circle One):

Cirrus (wispy) Cumulus (puffy clouds) Stratus

(dense and layered) Cumulous (Thunderclouds)

Est. Temp. \_\_\_\_\_ Actual Temp. \_\_\_\_\_

Est. Wind Dir. & Speed: \_\_\_\_\_

Actual Wind Dir. & Speed: \_\_\_\_\_

Colors of the Day:

Bald Eagle Adaptation Sketches: and Notes:

I now know:

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## Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



# Sensory Awareness

**Grade: 5**

**Duration:** 90-120 minutes

### Supplies

- Worksheets
- Pens/pencils

If indoors:

- Tape player with bird calls
- Materials from outside to touch
- Board
- Markers

### Summary

Observation skills are key to successful science. Students need to be able to use their senses to observe and record events to help aid in scientific inquiry. By using nature as the object of study, students will practice using their senses of sight, hearing, smell, and feel to make observations. By developing these observation skills, students will have the tools necessary to complete more complex scientific inquiries in the future.

### Objectives

By the end of this lesson, students will be able to-

- Describe their feelings during the quiet time using at least five different descriptive words and phrases.
- Predict the location of an animal/bird based on indirect observations (bird calls, scat)
- Make five observations each of sight, sound, feel, and smell during the outdoor quiet time.
- Explain three ways national wildlife refuges help protect wildlife.

### Standards

Science:

5.1.1.d, 5.1.1.e, 5.1.2.a, 5.3.1.a, 5.3.3.c, 5.3.3.d, 5.3.4.a, 5.4.3.b, 5.4.3.c

Language Arts:

LA 5.2.1.a, 5.2.2.a, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.b, 5.3.3.c

### Procedure

1. Students listen to the pre-lesson by a ranger. Help students get in tune with their senses by drawing their attention to something that works each of their senses and work as a group to properly describe the sense.
2. Teachers help arrange students along the trail. Students will be spaced so that they cannot talk to nor see other students. This is designed to give them the feeling that they are totally alone with nature.
3. Quiet observation on the trail begins. This observation will last approximately one hour. Students will record their experiences using the worksheet provided by their teachers.







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# Sensory Awareness

4. Gather the students from the trail to discuss what they just experienced. This will be a time to test to see if the objectives of the trip are met. The discussion leader will use the following questions:

- Can you describe what it was like to be alone in nature?
- What are some observations you had about sight, sound, smell and hearing?
- How were you able to tell if animals were present even if you did not see them?
- What makes DeSoto National Wildlife Refuge a special place?





# Scientific Observations and Sensory Awareness Nature Journal Entry

Animal/Insect Sketches: and Notes:

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Location: \_\_\_\_\_

Weather Conditions: \_\_\_\_\_

Cloud Coverage (Circle One):

Cirrus (wispy) Cumulus (puffy clouds) Stratus  
(dense and layered) Cumulous (Thunderclouds)

Est. Temp. \_\_\_\_\_ Actual Temp. \_\_\_\_\_

Est. Wind Dir. & Speed: \_\_\_\_\_

Actual Wind Dir. & Speed: \_\_\_\_\_

Colors of the Day:

Plant/Tree Sketches: and Notes:

I now know:

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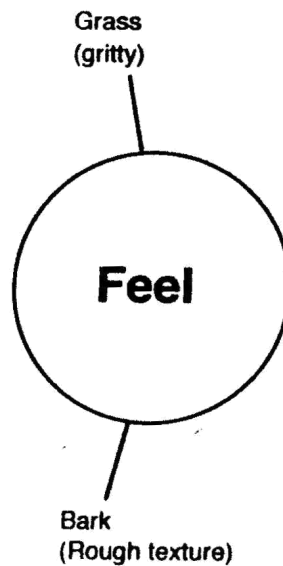
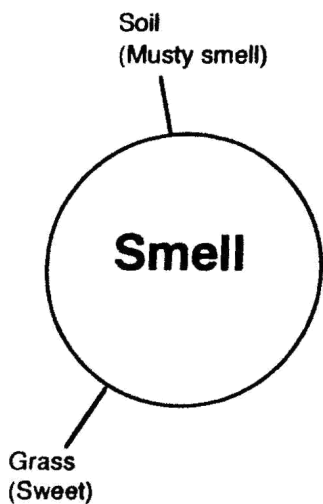
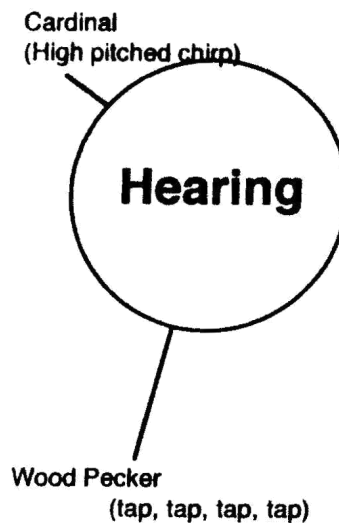
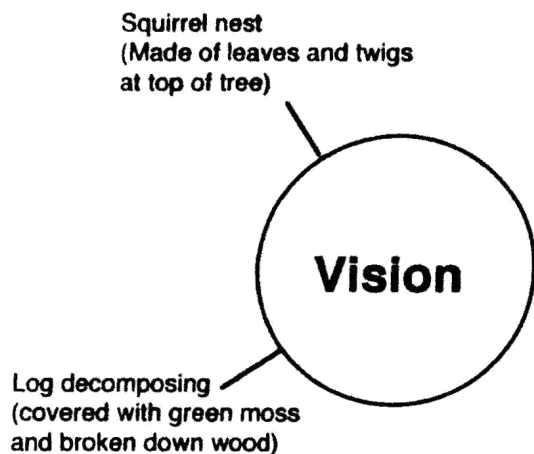
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# 1. Using Your Senses Webs







## Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



# Wetland Study

**Grade: 5**

**Duration:** 90-120  
minutes

### Supplies

- Nets
- Trays/Bins
- Spoons
- Viewers
- Key to Life in the Pond
- Model of aquatic invertebrates

### Summary

Wetlands are a disappearing but important part of the local ecosystems. Wetlands are responsible for many natural processes and hold a special place in area history. The wetland study will help the students learn that nature can be much more than meets the eye and that careful study you can learn some of its secrets.

### Objectives

By the end of this lesson, students will be able to-

- Use a key to identify and classify three different aquatic invertebrates.
- Choose appropriate methods of collecting pond samples.
- Propose two reasons why it is important to protect wetlands.
- Explain three ways national wildlife refuges help protect wildlife.

### Standards

Science:

5.1.1.b, 5.1.1.d, 5.3.1.a, 5.3.1.b, 5.3.2.b, 5.3.3.c, 5.3.3.d, 5.3.4.a, 5.4.3.b, 5.4.3.c

Language Arts:

LA 5.2.1.a, 5.3.2.a, 5.3.2.b, 5.3.2.c, 5.3.3.b

### Procedure

1. Meet the bus at the Wood Duck Pond Trail. Lead a discussion about what wetlands are, how aquatic invertebrate survive this environment and why wetlands are important.
2. Divide the students into groups of 2 or 3. Make sure each group gets a net, tray, spoon, viewer, and key. Demonstrate how to use both the nets and the viewer.
3. Set parameter for investigation area.
4. The refuge staff person and teachers will circulate during the investigation time. The students will use field guides to identify invertebrates.
5. Have students clean out equipment, hike back to parking lot and return the equipment. Wrap up session questions:
  - Based on what you have learned, why are wetlands important?
  - What are some ways national wildlife refuges protect wildlife?







# Blair DeSoto Environmental Education Partnership

*Blair Community Schools and DeSoto National Wildlife Refuge*



## 6th Grade State Standards

Science-

SC 1:

- 8.1.1.a Formulate testable questions that lead to predictions and scientific investigations
- 8.1.1.b Design and conduct logical and sequential investigations including repeated trials
- 8.1.1.d Select and use equipment appropriate to the investigation, demonstrate correct techniques
- 8.1.1.e Make qualitative and quantitative observations
- 8.1.1.f Record and represent data appropriately and review for quality, accuracy, and relevancy
- 8.1.1.g Evaluate predictions, draw logical inferences based on observed patterns/relationships, and account for non-relevant information
- 8.1.1.h Share information, procedures, results, and conclusions with appropriate audiences
- 8.1.1.j Use appropriate mathematics in all aspects of scientific inquiry
- 8.1.2.a Recognize science is an ongoing process and the scientific community accepts and uses explanations until they encounter new experimental evidence not matching existing explanations
- 8.1.3.f Distinguish between scientific inquiry (asking questions about the natural world) and technological design (using science to solve practical problems)
- 8.1.3.h Recognize that solutions have intended and unintended consequences
- 8.1.3.i Compare and contrast the reporting of scientific knowledge and the reporting of technological knowledge

SC 2:

- 8.2.1.b Describe physical and chemical properties of matter
- 8.2.1.c Recognize most substances can exist as a solid, liquid, or gas depending on temperature
- 8.2.1.d Compare and contrast solids, liquids, and gases based on properties of these states of matter
- 8.2.1.g Classify substances into similar groups based on physical properties

SC 3:

- 8.3.1.a Recognize the levels of organization in living organisms (cells, tissues, organs, organ systems, organisms)
- 8.3.1.e Describe how plants and animals respond to environmental stimuli
- 8.3.3.a Diagram and explain the flow of energy through a simple food web
- 8.3.3.b Compare the roles of producers, consumers, and decomposers in an ecosystem
- 8.3.3.c Recognize that producers transform sunlight into chemical energy through photosynthesis
- 8.3.3.d Determine the biotic and abiotic factors that impact the number of organisms an ecosystem can support
- 8.3.3.e Recognize a population is all the individuals of a species at a given place and time
- 8.3.3.f Identify symbiotic relationships among organisms
- 8.3.3.g Identify positive and negative effects of natural and human activity on an ecosystem
- SC8.3.4.a Describe how an inherited characteristic enables an organism to improve its survival rate
- 8.3.4.b Recognize the extinction of a species is caused by the inability to adapt to an environmental change







## Blair DeSoto Environmental Education Partnership

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SC 4:

8.4.2.e Compare and contrast constructive and destructive forces (deposition, erosion, weathering, plate motion causing uplift, volcanoes, earthquakes) that impact Earth's surface

8.4.3.b Identify factors that influence daily and seasonal changes on Earth (tilt of the Earth, humidity, air pressure, air masses)

8.4.3.c Describe atmospheric movements that influence weather and climate (air masses, jet stream) SC8.4.4.a

Recognize that Earth processes we see today are similar to those that occurred in the past (uniformity of processes)

8.4.4.b Describe how environmental conditions have changed through use of the fossil record

Language Arts

LA 6.2.1.a Use prewriting activities and inquiry tools, using available technology, to generate and organize information, guide writing, answer questions

LA 6.2.1.b Generate a draft by:

- Selecting and organizing ideas relevant to topic, purpose, and genre
- Composing paragraphs with simple, compound, and complex sentences, avoiding fragments and run-ons of varying length and complexity
- Concluding with detailed summary linked to the purpose of the composition

LA 6.2.2.a Write in a selected genre considering purpose (e.g., inform, entertain, persuade, instruct)

LA 6.2.2.b Write to a specified audience considering interests, background knowledge, and expectations (e.g., known or unknown individual, business, organization, cyber audience)

LA 6.2.2.c Write considering typical characteristics of the selected genre (e.g., biography, report, business memo, poem, essay, email, podcast)

LA 6.3.1.a Communicate ideas and information in a manner appropriate for the purpose and setting

LA 6.3.1.b Demonstrate and adjust speaking techniques for a variety of purposes and situations

LA 6.3.2.a Demonstrate listening skills needed for multiple situations and modalities (e.g., video, audio, distance, one-to-one, group)

LA 6.3.2.b Listen, ask questions to clarify, and take notes to ensure accuracy of information

LA 6.3.2.c Listen to, analyze, and evaluate message, purpose, and perspective of information being communicated

LA 6.3.3.b Apply conversation strategies (e.g., listen while others are talking, gain the floor, eye contact, tone, stay on topic, non-verbal cues)

LA 6.3.3.c Interact and collaborate with others in learning situations by contributing questions, information, opinions, and ideas using a variety of media and formats







## Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



# Leaf Lab & Inference Short Story



**Grade:** 6

**Duration**

60-90 minutes

**Supplies**

- Notebook
- Activity sheet
- Wooden boards
- Cloth
- Hammers

## Summary

Students will use the fall environment to enhance classroom learning. Through the leaf lab, students will make observations and measurements about three leaves of different colors. Students will use those leaves for leaf printing as a way to discuss chlorophyll. In the inference short story, students will use the natural environment as a context for observations and inference writing.

## Objectives

By the end of this lesson, students will be able to-

- Measure and observe characteristics of different leaves in the fall environment.
- Make observations and inferences about unique items in the outdoor classroom.

## Standards

Science:

8.1.1.e, 8.1.1.f, 8.2.1.g,

Language Arts:

6.2.1.a, 6.2.2.a, 6.3.1.a, 6.3.3.c

## Procedure

On the following pages.







# Blair DeSoto Environmental Education Partnership

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## Leaf Lab

### Procedure

1. Take a few minutes to find 1 green leaf. Make sure it is “fresh” and in good shape.
2. Using your ruler, measure the length of your green leaf in centimeters from the **bottom of the leaf** (do not include the stem) to the **highest part of the leaf**, and record the measurement in data table 1.
3. Using your ruler, measure the width of the green leaf in centimeters **at its widest point**, and record the measurement in data table 1.
4. Make 3 qualitative observations about your leaf and record them in data table 2.
5. Now, on the other side of this paper, trace around the leaf. Take your time to make sure it’s a good quality tracing. Label it by writing the leaf’s color inside the tracing (e.g. “Green”).
6. KEEP THAT LEAF! You will need it later. Now, repeat steps 2-5 with a “fresh” yellow/orange leaf, and then again with a “fresh” purple/red leaf.

**Data Table 1**

Leaf Color	Length	Width
Green	cm	cm
Yellow/Orange	cm	cm
Purple/Red	cm	cm

**Data Table 2**

Make 3 Qualitative observations for <b>GREEN</b>	1.
	2.
	3.
Make 3 Qualitative observations for <b>YELLOW/ORANGE</b>	1.
	2.
	3.
Make 3 Qualitative observations for <b>PURPLE/RED</b>	1.
	2.
	3.











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## Structure vs Function

**Grade:** 6

**Duration**

60-90 minutes

**Supplies**

- Activity Sheets
- Clipboards
- Hand Lens

**Structure vs. Function ~ Name \_\_\_\_\_ Period \_\_\_\_\_**

Draw **detailed** sketches of 4 various organisms. Observe 2 organisms with a Hand Lens and 2 without a Hand Lens

**Organism:** \_\_\_\_\_

Without Hand Lens

**Organism:** \_\_\_\_\_

Without Hand Lens

**Organism:** \_\_\_\_\_

With Hand Lens

**Organism:** \_\_\_\_\_

With Hand Lens

Take some time to think about why the organism would be structured like it is. Then on the back of this paper write at least **3 sentences** for each organism brainstorming on what the function of its structure might be.







## Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



# Snow Study



**Grade:** 6

**Duration**

60-90 minutes

**Supplies**

- Plastic cups for measuring snow
- Spring scales
- Jello mix
- Film Canisters
- Activity Sheets
- Clipboards

## Summary

Winter snow provides a great venue for learning and applying skills in measuring temperature, successful animal adaptations, physical properties and geometric shapes.

## Objectives

By the end of this lesson, students will be able to-

- Assess the quality of a den location for staying warm in the winter
- Determine weight, mass and volume of snow
- Make connections between geometric shapes and objects in nature

## Standards

Science:

8.1.1.e, 8.1.1.f, 8.2.1.g,

Language Arts:

6.2.1.a, 6.2.2.a, 6.3.1.a, 6.3.3.c

## Procedure

On the following pages.







# Blair DeSoto Environmental Education Partnership

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January DeSoto Trip — Name: \_\_\_\_\_ Per: \_\_\_\_\_

## J-E-L-L-O ~ “It’s Alive” ....for now!

1. Temperature before hibernation: \_\_\_\_\_ ° C
2. Temperature after hibernation: \_\_\_\_\_ ° C
3. Did your contents “survive” as a liquid or freeze to death as jello? \_\_\_\_\_
4. Where did you choose to hibernate? \_\_\_\_\_
5. Explain why you think your hibernation spot did or did not work and if there are any ways to improve next time.

## Physical Properties of Snow ~ (Complete in your snow fort)

**1. Scoop snow from the top of your fort. Level it with the rim of the cup at the top.**

**DO NOT PACK IN THE SNOW!**

- Weight of snow: \_\_\_\_\_ N
- Mass of snow: \_\_\_\_\_ g
- Volume of snow: 266 mL

\*\*\* Next week:

If mass = \_\_\_\_\_ and volume = \_\_\_\_\_ then density of snow = \_\_\_\_\_ mass ÷ volume

**2. Scoop snow from the bottom of your fort. Level it with the rim of the cup at the top.**

**DO NOT PACK IN THE SNOW!**

- Weight of snow: \_\_\_\_\_ N
- Mass of snow: \_\_\_\_\_ g
- Volume of snow: 266 mL

\*\*\* Next week:

If mass = \_\_\_\_\_ and volume = \_\_\_\_\_ then density of snow = \_\_\_\_\_ mass ÷ volume

**3. Now pack the snow tightly into the cup. Make sure it is level with the rim.**

- Weight of snow: \_\_\_\_\_ N
- Mass of snow: \_\_\_\_\_ g
- Volume of snow: 266 mL

\*\*\* Next week:

If mass = \_\_\_\_\_ and volume = \_\_\_\_\_ then density of snow = \_\_\_\_\_ mass ÷ volume







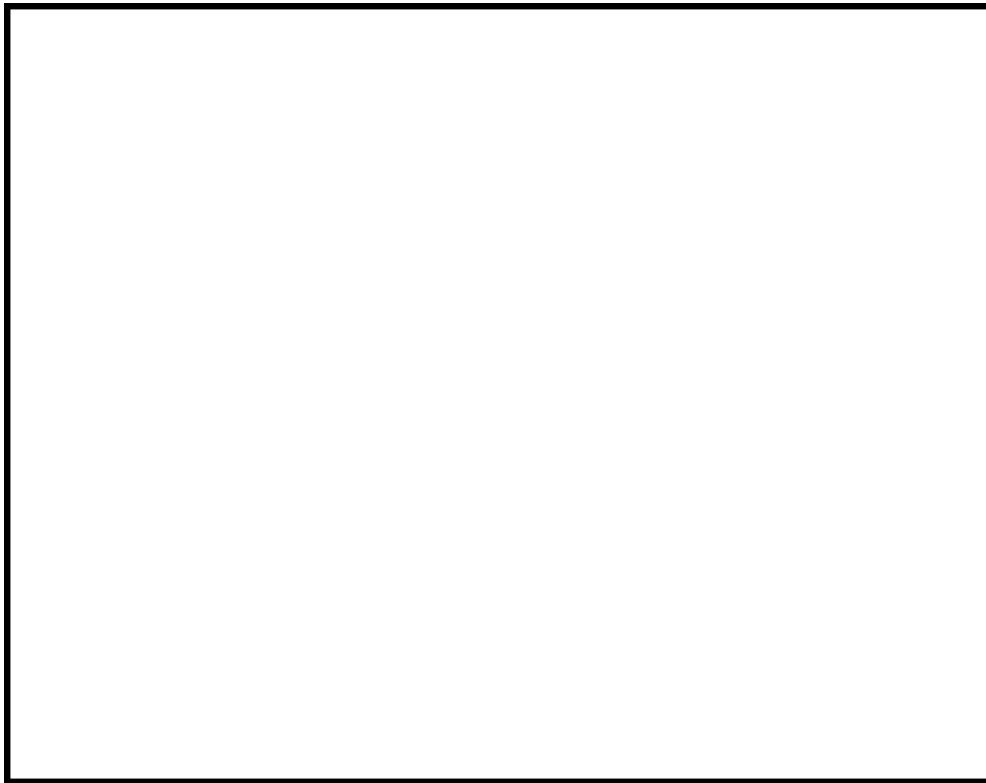
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## Snowflake Geometry ~ (Complete in your snow fort)

In this activity, you will **observe a snowflake** with a hand lens/microscope and **sketch it**. Make sure your sketch is large enough to fill the box below. Once your sketch is complete, **choose 8 or more terms** from the word bank and **label them** using the corresponding number on your snowflake sketch.



### TABLES

- Use the number of the word to mark its location on your snowflake.

1. Adjacent angles
2. Complimentary angles
3. Supplementary angles
4. Point
5. Line
6. Ray
7. Congruent angles
8. Plane
9. Right angle
10. Obtuse angles
11. Straight angle







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## Observing Physical Properties

As you look through the museum displays choose **unique** items and record their physical properties.

Property	Item: _____	Item: _____	Item: _____	Item: _____
Color(s)				
Geometric shape(s)				
Guess the odor				
Estimate size (cm or m)				
State of matter				
Estimate volume				
Estimate mass				







## Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



# Soil Sampling

**Grade: 6**

**Duration**

60-90 minutes

### Supplies

- Activity Sheets
- Clipboards
- Coffee Can
- Spoon
- Toothpick
- Microscope

## De Soto Soil Sampling

Names: \_\_\_\_\_

Your teacher will demonstrate how to collect your soil sample. Once you have your soil, drop it onto the newspaper and spread to observe. Use your spoons and toothpicks to separate the components of the soil.

• Initial Observation/Eyes: soil color, texture, and large pieces. **If you find any larger particles, record the length or width in millimeters.**

• First observe using your hand lens, and then describe as much detail as possible what you see in the soil. Record all of the above.

• Then observe with a hand lens to record/draw the particles you can see in greater clarity now.

• Spread a very small amount onto one half of a Petri dish and observe using one of the microscopes. Record all of the above.

ITEMS that may be in the soil you see: sand, silt, clay, rock, roots, leaves, stems, seeds, berries, nuts & shells, worms, insects, animal remains (hair, fur, bones, etc.), water, salt, minerals, larvae or eggs cases, etc.

**What type of material makes up the majority of the soil?**

### Soil Sample #1

	DRAW what you see	LIST what you see (include length in mm)
Eyes		
Hand Lens		
Microscope		
Colors		
Texture		







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## Soil Sample #2

	DRAW what you see	LIST what you see (include length in mm)
Eyes		
Hand Lens		
Microscope		
Colors		
Texture		

## Soil Particle Settling

1. Get a clear container and fill it with 1 inch of soil.
2. Fill the rest of the container full with water and seal it with a lid. Record lid letter \_\_\_\_\_
3. Shake for 1 minute and then set it down to observe later.
4. When we return to observe, carefully look at your container (**DON'T SHAKE!**) and draw a picture of the layers you see below.

## Write or Draw about erosion

When we look at the erosion site, either write a description or draw a NEAT picture of the erosion that you see.







# Blair DeSoto Environmental Education Partnership

*Blair Community Schools and DeSoto National Wildlife Refuge*



## 7th Grade State Standards

Science-

SC 1:

- 8.1.1.a Formulate testable questions that lead to predictions and scientific investigations
- 8.1.1.b Design and conduct logical and sequential investigations including repeated trials
- 8.1.1.c Determine controls and use dependent (responding) and independent (manipulated) variables
- 8.1.1.d Select and use equipment appropriate to the investigation, demonstrate correct techniques
- 8.1.1.e Make qualitative and quantitative observations
- 8.1.1.f Record and represent data appropriately and review for quality, accuracy, and relevancy
- 8.1.1.g Evaluate predictions, draw logical inferences based on observed patterns/relationships, and account for non-relevant information
- 8.1.1.h Share information, procedures, results, and conclusions
- 8.1.1.j Use appropriate mathematics in all aspects of scientific inquiry
- 8.1.2.a Recognize science is an ongoing process and the scientific community accepts and uses explanations until they encounter new experimental evidence not matching existing explanations
- 8.1.2.b Describe how scientific discoveries influence and change society
- 8.1.3.g Describe how science and technology are reciprocal
- 8.1.3.h Recognize that solutions have intended and unintended consequences
- 8.1.3.i Compare and contrast the reporting of scientific knowledge and the reporting of technological knowledge

SC 3:

- 8.3.1.e Describe how plants and animals respond to environmental stimuli
- 8.3.3.a Diagram and explain the flow of energy through a simple food web
- 8.3.3.b Compare the roles of producers, consumers, and decomposers in an ecosystem
- 8.3.3.a Diagram and explain the flow of energy through a simple food web
- 8.3.3.b Compare the roles of producers, consumers, and decomposers in an ecosystem
- 8.3.3.d Determine the biotic and abiotic factors that impact the number of organisms an ecosystem can support
- 8.3.3.e Recognize a population is all the individuals of a species at a given place and time
- 8.3.3.f Identify symbiotic relationships among organisms
- 8.3.3.g Identify positive and negative effects of natural and human activity on an ecosystem
- 8.3.4.a Describe how an inherited characteristic enables an organism to improve its survival rate
- 8.3.4.b Recognize the extinction of a species is caused by the inability to adapt to an environmental change
- 8.3.4.c Use anatomical features of an organism to infer similarities among other organisms

SC 4:

- 8.4.4.a Recognize that Earth processes we see today are similar to those that occurred in the past (uniformity of processes)







## **Blair DeSoto Environmental Education Partnership**

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### Language Arts-

LA 7.2.1.a Use prewriting activities and inquiry tools, using available technology, to generate and organize information, guide writing and answer questions

LA 7.2.1.b Generate a draft by:

- Selecting and organizing ideas relevant to topic, purpose, and genre
- Composing paragraphs with sentences of varying length and complexity avoiding fragments and run-ons
- Using effective transitional words and cues to unify important ideas

LA 7.2.2.a Write in a variety of genres, considering purpose (e.g., inform, entertain, persuade, instruct)

LA 7.2.2.b Write in a variety of genres, considering audience (e.g., a known or unknown individual, a business, organization, or cyber audience)

LA 7.2.2.c Write considering typical characteristics of the selected genre (e.g., letter to the editor, report, email, class notes, essay, research paper, play)

LA 7.2.2.d Select and apply an organizational structure appropriate to the task (e.g., order of importance, similarity and difference, posing and answering a question)

LA 7.2.2.e Analyze models and examples (own and others) of various genres in order to create a similar piece

LA 7.3.1.a Communicate ideas and information in a manner appropriate for the purpose and setting

LA 7.3.1.b Demonstrate and adjust speaking techniques for a variety of purposes and situations

LA 7.3.1.c Utilize available media to enhance communication

LA 7.3.2.a Apply listening skills needed for multiple situations and modalities (e.g., video, audio, distance, one-to-one, group)

LA 7.3.2.b Listen and ask probing questions to elicit information

LA 7.3.2.c Listen to, analyze, and evaluate message, purpose, and perspective of information being communicated

LA 7.3.3.b Apply conversation strategies (e.g., listen while others are talking, eye contact, tone, stay on topic, non-verbal cues)

LA 7.3.3.c Interact and collaborate with others in learning situations by contributing questions, information, opinions, and ideas using a variety of media and formats







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# Nature Scavenger Hunt Lab

**Grade: 7**

**Duration**  
30 minutes

### Supplies

- Scavenger hunt list
- Camera
- Identification guide for trees and plants

Expanding the Classroom Walls II

Detailed Lesson Plan

### Nature Scavenger Hunt

**Objective:** To introduce the students to the wildlife refuge and get them to use their observation & inference skills. Students learn how to make good observations and inferences in class and now will practice these skills in nature.

**Inspiration:** This lesson was inspired by our visit to Mahoney State Park where we did a similar activity.

**Grade Subject/ Level:** Science 7 – easily adaptable for different levels.

**Materials:**

Scavenger hunt list

Camera

Identification Guide for Trees and Plants

**Lesson Procedure:**

We will be using the trail outside of the Visitor's center at Desoto Wildlife refuge.

Hand out the scavenger hunt cards.

Explain to students that they need to take a digital picture of the items on the list unless they are asked to do otherwise. Please remind students that because this is a wildlife refuge we may not collect or remove anything from the refuge so they may not pick berries or leaves to show as proof.

Break students into groups of 4 to complete the scavenger hunt. Students will have 20 minutes to find as many items as they are able to find.

The group that locates the most items will be given a prize.







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# Nature Scavenger Hunt Lab

## Scavenger Hunt List

You need to bring back a picture of each item. Please do not bring back any items. You have 15 minutes to see how many of the following items you can find.

Draw the following items:

Poison ivy

Animal tracks

Virginia Creeper

An Insect (try to name it)

Take a picture of:

Cottonwood Tree

Butterfly

Bird /bonus if can identify

Coniferous Tree

Spider Web

Choose 2 items and make 2 Qualitative & 2 Quantitative observations for each. Label the Qualitative & Quantitative observations.







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# Nature Scavenger Hunt Lab

## Flooding:

There are 4 markers along the roadway you will need to take a picture at each point. We will be downloading these photos to make a journal as the water recedes.

You will also need to record the water level at each marker. You will then mark these areas on the map.

Example: Water is over the road at point A.

There are trees that you can see. Estimate how much the water has receded by looking at the markings the water left on the trees. Do this at each of the markers.

Finally draw a map showing the roadway, the administration building, each of our markers and show the flooding on your map. Show the trees and record your observations from above on the map.







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# Ecosystem Lab



**Grade: 7**

**Duration**  
60 minutes

### Supplies

- Ecosystem Lab sheet
- Pencils

## DeSoto Lake

1. Find two different plant organisms and two different animal or insect organisms. With each one, write down at least four different *quantitative* observations and five different *qualitative* observations.

**Plant Organism 1:**

**Plant Organism 2:**

**Animal or Insect Organism:**

**Animal or Insect Organism:**

2. Find two abiotic factors and describe three qualitative observations about each of them.

**Abiotic Factor 1:**

**Abiotic Factor 2:**

3. When you combine all of the organisms you identified from this area and all of the abiotic factors, what are you describing? (*Circle the best answer*)

- a. Population      b. Community      c. Ecosystem      d. Species

4. Find as many different animal or insect organisms as you can and list them below. If you do not know the name of the organism, describe it.







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# Ecosystem Lab

## Bottom Land Hardwood Forest

1. Find at least two plant organisms and one animal organism. With each one, write down at least four different quantitative observations and five different qualitative observations.

**Plant Organism 1:**

**Plant Organism 2:**

**Animal Organism 1:**

2. When you describe all of the above organisms in the same area, what are you describing? *(Circle the best answer)*

- a. Population      b. Community      c. Ecosystem      d. Species

3. Find at least two indirect observations of animal or insect organisms. With each one, write down at least two qualitative observations.

**Organism 1:**

**Organism 2:**

4. Find as many different animal or insect organisms as you can and list them below. If you do not know the name of the organism, describe it.







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# Ecosystem Lab

## Prairie

1. Find at least two plant organisms and two animal or insect organisms. With each one, write down at least four different quantitative observations and five different qualitative observations.

***Plant Organism 1:***

***Plant Organism 2:***

***Animal or Insect Organism 1:***

***Animal or Insect Organism 2:***

2. Pretend that you are a world traveler and are seeing this type of ecosystem for the first time and you want to describe it to a friend back in your hometown, many miles away. You will write a journal or diary entry that uses many descriptive words (Adjectives. Observations.) that best describes everything about the ecosystem. Be sure to include descriptions of the organisms you see (direct or indirect observations), the abiotic factors you see, and any other observation you can make. This needs to be two paragraphs long with each paragraph having at least four sentences.

3. Find as many different animal or insect organisms as you can and list them below. If you do not know the name of the organism, describe it.







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# Estimating Tree Lab



**Grade: 7**

**Duration**  
60 minutes

### Supplies

- Estimating trees lab sheet
- Flagged area for estimation
- Meter stick for measuring step size

### Estimating the number of trees within a wooded area

Suppose you are working for a forest conservation organization. You are in charge of determining the approximate number of trees within a 100,000 square foot area. Follow the steps below.

1. Estimate the length and width of the roped area.

- a. Measure your stride to the nearest half-foot. Place a tape measure on the ground. Beginning with your toe at the beginning take one "normal" step and write your stride here:

- b. Find the **length** of the roped off area. Beginning with your toe at a corner take normal strides along one side of the area counting them as you go. Write the number of strides here:

Multiply your stride length from part 'a' with your number of strides to find the estimated length:

- c. Find the **width** of the roped off area. Beginning with your toe at a corner take normal strides along the adjacent side of the area counting them as you go. Write the number of strides here:

Multiply your stride length from part 'a' with your number of strides to find the estimated width:

2. Estimate the Area of the roped off section.

- a. Multiply the length and width from #1b and #1c above.







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3. Count the number of trees in the roped off section and write that number here:

4. Estimate the number of trees in a 100,000 square foot wooded area using a proportion.  
Here is an example:

My number of trees  
from #3 above

My estimated area  
from #2 above

$$\frac{20 \text{ trees}}{2,400 \text{ ft}^2} = \frac{n}{100,000 \text{ ft}^2}$$

Cross multiply to get an equation:  $2,400n = 2,000,000$

Solve by dividing:  $2,000,000 \div 2,400 = 833.3333$

So, for this example, there are approximately 833 trees within the 100,000 square foot wooded area.







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# GPS Scavenger Hunt

**Grade: 7**

**Duration**

60 minutes

**Supplies**

- GPS lab sheet
- GPS unit
- Food, water and shelter cards

Desoto GPS Lab

Name \_\_\_\_\_

GPS 1 \_\_\_\_\_

GPS 2 \_\_\_\_\_

*For Animal 1 you will find the following items and place the cards in the place you think they could find these items.*

Animal 1 Name:

*Describe the area that you put each item in and explain how the organism would meet this need. Also next to each item write down what you named it on the GPS.*

Food Source:

Water:

Shelter:

What type of habitat does your animal live in?

What other animals live in this area? Will they affect your animal?

Draw a food chain showing at least 3 organisms and includes your animal.







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# GPS Scavenger Hunt

*For Animal 2 you will find the cards placed by the other group and describe how its habitat will help it to get the things that it needs to survive.*

Animal 2 Name:

*Describe the area that you put each item in and explain how the organism would meet this need. Also next to each item write down what you named it on the GPS.*

Food Source:

Water:

Shelter:

What type of habitat does your animal live in?

What other animals live in this area? Will they affect your animal?

Did you find signs of animals while you were completing this activity. Describe what signs you found.

Draw a food chain showing at least 3 organisms and includes your animal.







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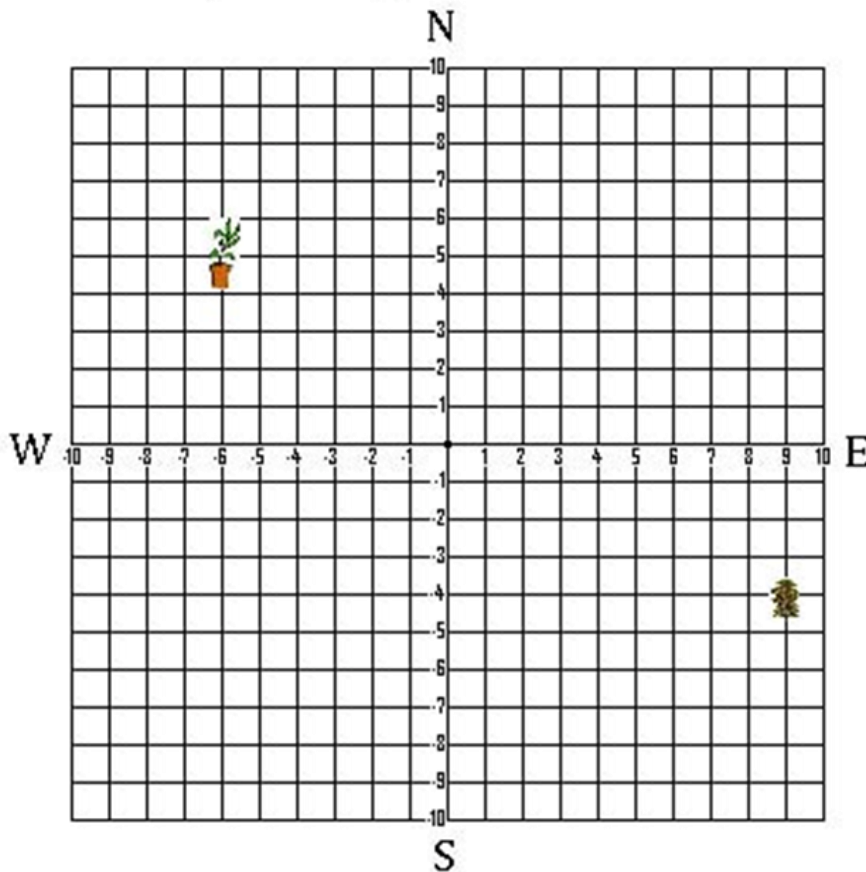
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## DESOTO COORDINATE PLANE ACTIVITY

Find the coordinates (to the nearest positive/negative foot) of each listed item. First write the location with directions then write the ordered pair with integers.

1. Find the point of origin.
2. Locate each direction (North, South, West, East)
3. Familiarize yourself with the coordinate plane - For example, Quadrant 1 will be North and East of the origin, etc.
4. Use the examples below to help.



**Example 1: Find the coordinates of the plant.**

Answer: 6 Feet West and 5 Feet North  $(-6, 5)$

**Example 2: Find the coordinates of the tree.**

Answer: 9 feet East and 4 feet south  $(9, -4)$

Created by ONS, Blair NE - 2011







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Find the coordinates (to the nearest positive/negative foot) of each listed item. First write the location with directions then write the ordered pair with integers.

1. Birdhouse #1 (quadrant 1)
2. Large stump (quadrant 3)
3. Birdhouse # 2
4. Center post on right side of shelter

Using your coordinates and knowledge of coordinate planes find the horizontal or vertical distance.

5. Using only the coordinates you found above, find the distance between birdhouse #2 and the stump.

Name the item found at each of the following locations. **DO NOT TOUCH OR MOVE THE PLACED ITEMS. DO NOT TELL OTHER GROUPS WHAT THE ITEMS ARE OR WHERE THEY ARE LOCATED.**

6. 40 feet west and 65 feet North (-40, 65)
7. 50 feet West and 30 feet south (-50, -30)
8. 90 feet East and 168 feet North (90, 168)







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Find the coordinates (to the nearest positive/negative foot) of each listed item. First write the location with directions then write the ordered pair with integers.

1. Birdhouse #1 (quadrant 1)
2. Large stump (quadrant 3)
3. Birdhouse # 2
4. Center post on right side of shelter

Using your coordinates and knowledge of coordinate planes find the horizontal or vertical distance.

5. Using only the coordinates you found above, find the distance between birdhouse #2 and the stump.

Name the item found at each of the following locations. **DO NOT TOUCH OR MOVE THE PLACED ITEMS. DO NOT TELL OTHER GROUPS WHAT THE ITEMS ARE OR WHERE THEY ARE LOCATED.**

1. 67 feet west and 92 feet North (-67, 92)
2. 80 feet East and 70 feet South (80, -70)
3. 40 feet East and 152 feet North (40, 152)







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Find the coordinates (to the nearest positive/negative foot) of each listed item. First write the location with directions then write the ordered pair with integers.

1. Birdhouse #1 (quadrant 1): **103 feet East, 33 feet North (103, 33)**
2. Large stump (quadrant 3): **33 feet West, 53 feet South (-33, -53)**
3. Birdhouse # 2: **33 feet West, 49 feet North (-33, 49 feet)**
4. Center post on right side of shelter: **111 feet West, 58 feet North (-111, 58)**

Using your coordinates and knowledge of coordinate planes find the horizontal or vertical distance.

5. Using only the coordinates you found above, find the distance between birdhouse #2 and the stump.

**(-33, 49) and (-33, -53)**

$$49 - (-53) = 49 + 53 = 102 \text{ feet}$$

Name the item found at each of the following locations. **DO NOT TOUCH OR MOVE THE PLACED ITEMS. DO NOT TELL OTHER GROUPS WHAT THE ITEMS ARE OR WHERE THEY ARE LOCATED.**

1. 40 feet west and 65 feet North (-40, 65)

**Golf Ball**

2. 50 feet West and 30 feet south (-50, -30)

**Small floss container**

3. 90 feet East and 168 feet North (90, 168)

**Teacher appreciation trinket (pink hair)**







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Find the coordinates (to the nearest positive/negative foot) of each listed item. First write the location with directions then write the ordered pair with integers.

1. Birdhouse #1 (quadrant 1): **103 feet East, 33 feet North (103, 33)**
2. Large stump (quadrant 3): **33 feet West, 53 feet South (-33, -53)**
3. Birdhouse # 2: **33 feet West, 49 feet North (-33, 49 feet)**
4. Center post on right side of shelter: **111 feet West, 58 feet North (-111, 58)**

Using your coordinates and knowledge of coordinate planes find the horizontal or vertical distance.

5. Using only the coordinates you found above, find the distance between birdhouse #2 and the stump.

**(-33, 49) and (-33, -53)**

$$49 - (-53) = 49 + 53 = 102 \text{ feet}$$

Name the item found at each of the following locations. **DO NOT TOUCH OR MOVE THE PLACED ITEMS. DO NOT TELL OTHER GROUPS WHAT THE ITEMS ARE OR WHERE THEY ARE LOCATED.**

4. 67 feet west and 92 feet North (-67, 92)

**Whiteout bottle**

5. 80 feet East and 70 feet South (80, -70)

**Small travel bottle of scope**

6. 40 feet East and 152 feet North (40, 152)

**Small Santa decoration**



Created by OMS, Blair NE - 2011





# Blair DeSoto Environmental Education Partnership

*Blair Community Schools and DeSoto National Wildlife Refuge*



## 8th Grade State Standards

Science-

SC 1:

- 8.1.1.a Formulate testable questions that lead to predictions and scientific investigations
- 8.1.1.b Design and conduct logical and sequential investigations including repeated trials
- 8.1.1.c Determine controls and use dependent (responding) and independent (manipulated) variables
- 8.1.1.d Select and use equipment appropriate to the investigation, demonstrate correct techniques
- 8.1.1.e Make qualitative and quantitative observations
- 8.1.1.f Record and represent data appropriately and review for quality, accuracy, and relevancy
- 8.1.1.g Evaluate predictions, draw logical inferences based on observed patterns/relationships, and account for non-relevant information
- 8.1.1.h Share information, procedures, results, and conclusions with appropriate audiences
- 8.1.1.i Analyze and provide appropriate critique of scientific investigations
- 8.1.1.j Use appropriate mathematics in all aspects of scientific inquiry
- 8.1.2.a Recognize science is an ongoing process and the scientific community accepts and uses explanations until they encounter new experimental evidence not matching existing explanations
- 8.1.2.b Describe how scientific discoveries influence and change society
- 8.1.3.f Distinguish between scientific inquiry (asking questions about the natural world) and technological design (using science to solve practical problems)
- 8.1.3.g Describe how science and technology are reciprocal
- 8.1.3.h Recognize that solutions have intended and unintended consequences
- 8.1.3.i Compare and contrast the reporting of scientific knowledge and the reporting of technological knowledge
- 8.3.1.e Describe how plants and animals respond to environmental stimuli

SC 3:

- 8.3.2.a Recognize that hereditary information is contained in genes within the chromosomes of each cell
- 8.3.2.b Compare and contrast sexual and asexual reproduction
- 8.3.3.a Diagram and explain the flow of energy through a simple food web
- 8.3.3.b Compare the roles of producers, consumers, and decomposers in an ecosystem
- 8.3.3.c Recognize that producers transform sunlight into chemical energy through photosynthesis
- 8.3.3.d Determine the biotic and abiotic factors that impact the number of organisms an ecosystem can support
- 8.3.3.e Recognize a population is all the individuals of a species at a given place and time
- 8.3.3.f Identify symbiotic relationships among organisms
- 8.3.3.g Identify positive and negative effects of natural and human activity on an ecosystem
- 8.3.4.a Describe how an inherited characteristic enables an organism to improve its survival rate
- 8.3.4.b Recognize the extinction of a species is caused by the inability to adapt to an environmental change

SC 4:







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8.4.2.h Classify Earth materials as renewable or nonrenewable

SC8.4.3.a Describe how energy from the Sun influences the atmosphere and provides energy for plant growth

SC8.4.3.b Identify factors that influence daily and seasonal changes on Earth (tilt of the Earth, humidity, air pressure, air masses)

SC8.4.3.c Describe atmospheric movements that influence weather and climate (air masses, jet stream)

SC8.4.4.a Recognize that Earth processes we see today are similar to those that occurred in the past (uniformity of processes)

SC8.4.4.b Describe how environmental conditions have changed through use of the fossil record

### Language Arts-

LA 8.2.1.a Use prewriting activities and inquiry tools to generate and organize information, guide writing, answer questions, and synthesize information

LA 8.2.1.b Generate a draft by:

- Defining and stating a thesis

- Structuring ideas and arguments in an effective and sustained way, following an organizational pattern appropriate to the purpose and intended audience

- Identifying and using parallelism to present items in a series and items juxtaposed for emphasis

LA 8.2.2.a Write in a variety of genres, considering purpose and audience

LA 8.2.2.b Write considering typical characteristics of the selected genre (e.g., business letter, report, email, class notes, research paper, play, web page/blog)

LA 8.3.1.a Communicate ideas and information in a manner appropriate for the purpose and setting

LA 8.3.1.b Demonstrate and adjust speaking techniques for a variety of purposes and situations

LA 8.3.1.c Utilize available media to enhance communication

LA 8.3.2.a Apply listening skills needed for multiple situations and modalities (e.g., video, audio, distance, one-to-one, group)

LA 8.3.2.b Listen and ask questions concerning the speaker's content, delivery, and purpose.

LA 8.3.2.c Listen to, analyze, and evaluate thoughts, ideas, and credibility of information being communicated

LA 8.3.3.b Interact and collaborate with others in learning situations by contributing questions, information, opinions, and ideas using a variety of media and formats

LA 8.3.3.c Respect diverse perspectives while collaborating and participating as a member of the community

LA 8.4.1.a Select and use multiple resources to answer questions and support conclusions using valid information (e.g., print, subscription databases, web resources)

LA 8.4.1.f Gather and share information and opinions as a result of communication with others (e.g., video/ audio chat, interview, podcast, multi-media presentations)







## Blair DeSoto Environmental Education Partnership

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# Leaf Rubbing

**Grade 8**

**Duration**

**60-90 minutes**

**Supplies**

- White paper
- Crayons
- Leaves

### LEAF RUBBINGS

1. Collect 2 different leaves as you explore.
2. Fold a piece of plain white paper in half.
3. Position the leaf 'vein side up' inside the paper.
4. Select a crayon piece (peel of any paper on it).
5. Turn the crayon on its side and rub over the top of the folded paper (with leaf 'vein side up' inside).
6. Select another color if you would like.
7. Repeat with the second leaf on the other half of the paper.

Label the following on each rubbing:

1. Petiole (structure that connected the blade to the stem or branch you removed it from).
2. Blade (entire colored part of leaf except petiole)
3. Margin (rim or edge of blade)
4. Midrib (central vein of the blade)
5. Side vein (branches off the midrib)

Answer the following questions about each leaf:

1. Did your leaf come from tree, grass or shrub?
  - a.
  - b.
2. What is the actual color of the leaf?
  - a.
  - b.
3. Is your rubbing of the upper or lower epidermis (outer layer)?
  - a.
  - b.
4. Did the leaf come from a monocot (parallel veins) or dicot (branching veins)?
  - a.
  - b.
5. Use the tree guide to determine what type of tree the leaf came from:
  - a.
  - b.







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# Math Tree Graph

Grade 8

Duration

60-90 minutes

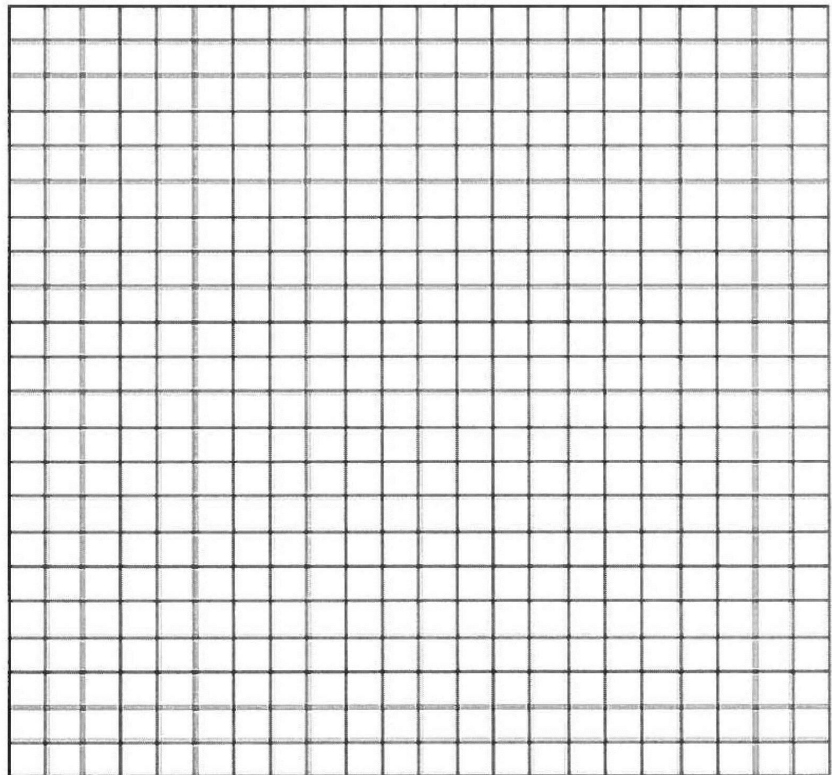
Supplies

- Graph paper
- Rope
- Calculator (optional)

### How Many Trees Does Thee See Activity

Count **ALL** of the trees **and tree stumps** in the roped off area. **DO NOT** walk in the roped off area. You may need to walk around to make sure you get every tree and stump counted. Once you have finished counting, write down your data here: \_\_\_\_\_. Use this number to help solve the following questions. When finished, give this to your math teacher and have them sign your DeSoto Scavenger Hunt Worksheet if it is finished correctly.

1. Assuming all of the tree stumps were cottonwood trees, what percentage of all of the trees are cottonwood trees? Show your work:
2. Make a bar graph charting living trees and trees that are not living. Make sure you label each axis and the data that you are graphing. Add an appropriate title that reflects both axis and include correct units in the labels.







# Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



## Visual Poet

Grade 8

Duration  
60-90 minutes

Supplies  
• iPad

### Visual Poet: DeSoto

NAME: \_\_\_\_\_ IPAD NUMBER: \_\_\_\_\_

You will be creating another filmstrip poem while out at DeSoto – similar to the one that you completed in class yesterday. The steps are the same, but the pictures and sentences must be different.

First, you must take **3 pictures** out at DeSoto:

1. Something unique to DeSoto
2. Something man-made
3. Something in motion

These pictures will be connected to your descriptive writing, **so choose wisely!** Be thoughtful about your pictures – take them so that they look nice!

Open the “Visual Poet” app, just like we did yesterday.

Tap a panel, and tap the black bar at the bottom of the screen that says “New Image,” and tap the words “From Library.” From there, you will be able to find one of your pictures and format it so that it shows up in your panel. Choose the part of the photo that you want in your panel, and double tap the area that you’ve chosen.

For each picture, you must write a detailed, descriptive sentence. **Be creative!** You can tell a story with your sentence, or you can just describe what is in the box, but you must use **vivid verbs** and **detailed adjectives** in a **complete sentence** to describe what is in the box.

To add text, tap the picture. A small, white box will pop up, and all you have to do is start typing. When you are finished with your sentence, move the box to where you want it to be in the picture. Swipe your finger from left to right to get back to the main screen.

Write your three sentences here:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Complete the process for all three panels.**

When you have filled all three panels with a picture and sentence, title your poem by tapping the box, write your name under credits, and tap “Save.”

When we get back to Otte, you will send me your poems.

You will be graded on the following:

- Quality/accuracy of pictures
- Complete sentences
- Descriptive, meaningful writing







# Blair DeSoto Environmental Education Partnership

Blair Community Schools and DeSoto National Wildlife Refuge



## Nature Walk

Grade 8

Duration  
60-90 minutes

### Supplies

- Activity Sheet
- Clip board



On your nature walk, fill in the following information in the chart below with your observations.

Number of nests	Number of feathers	Number of birds observed	Number of feces deposits	Number of bird songs/sounds

In the space below create a bar graph including all the information in the chart above. Remember to also include labels on axes and an appropriate title.







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# Nature Walk

Based on your observations, interpret your data table and bar graph to determine how many individual birds you witnessed. Your inference should be explained in a paragraph. Take into consideration how many birds you saw that were also creating the songs, had made the nests, etc.

Can you identify any of the birds by species (eagle, robin, duck, etc.)? If so, name them below:







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## 12th Grade State Standards

### Science

#### SC 1: Inquiry, the Nature of Science, and Technology

12.1.1 Students will develop and conduct investigations that lead to the use of logic and evidence in the formulation of scientific explanations and models.

12.1.1.a Formulate a testable hypothesis supported by prior knowledge to guide an investigation

12.1.1.b Design and conduct logical and sequential scientific investigations with repeated trials and apply findings to new investigations

12.1.1.d Select and use lab equipment and technology appropriately and accurately

12.1.1.e Use tools and technology to make detailed qualitative and quantitative observations

12.1.1.f Represent and review collected data in a systematic, accurate, and objective manner

12.1.1.g Analyze and interpret data, synthesize ideas, formulate and evaluate models, and clarify concepts and explanations

12.1.1.h Use results to verify or refute a hypothesis

12.1.1.i Propose and/or evaluate possible revisions and alternate explanations

12.1.1.k Evaluation scientific investigations and offer revisions and new ideas as appropriate

12.1.1.I Use appropriate mathematics in all aspects of scientific inquiry

12.1.2 Students will apply the nature of scientific knowledge to their own investigations and in the evaluation of scientific explanations

12.1.2.a Recognize that scientific explanations must be open to questions, possible modifications, and must be based upon historical and current scientific knowledge

12.1.2.b Describe how society influences the work of scientists and how science, technology, and current scientific discoveries influence and change society

#### SC 3: Life Sciences

12.3.1.d Describe how an organism senses changes in its internal or external environment and responds to ensure survival

12.3.3.b Recognize that atoms and molecules cycle among living and nonliving components of the biosphere

12.3.3.c Explain how distribution and abundance of different organisms in ecosystems are limited by the availability of matter and energy and the ability of the ecosystem to recycle materials

12.3.3.d Analyze factors which may influence environmental quality

12.3.4 Students will describe the theory of biological evolution

12.4.2.c Evaluate the impact of human activity and natural causes on Earth's resources (groundwater, rivers, land, fossil fuels)







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Name(s) \_\_\_\_\_

## What's in an Ecosystem?

How well do you know the environment around your home or school? You may walk through it every day without noticing most of the living things it contains or thinking about how they survive. Ecologists, on the other hand, observe organisms and seek to understand how ecosystems work. In this lab, you will play the role of an ecologist by closely observing part of your environment.

## Objectives

**Survey** an area of land and determine the land's physical features and the types of organisms that live there.

**Identify** possible relationships between organisms that live in the area of land you surveyed.

## Standards

## Materials

- Hand lens
- Colored pencils
- Pencil
- Piece of cardstock
- Field guide to insects or plants
- 4 stakes, 50 m of string (already in place)

## Procedure

1. Use a tape measure or meter stick to measure a 10 m x 10 m site to study. Place one stake at each corner of the site. Loop the string around each stake and run the string from one stake to the next to form boundaries for the site. (Already done for you)
2. Survey the site and then prepare a site map of physical features of the area on cardstock. For example, show the location of streams, sidewalks, trails, large rocks, and the direction of any noticeable slopes.
3. Create a set of symbols to represent the organisms at your site. For example, you might use green triangles to represent trees, blue circles to represent insects, or brown squares to represent animal burrows or nests. At the bottom or side of the cardstock, make a key for your symbols.
4. Draw your symbols on the map to show the location and relative abundance of each type of organism. If there is not enough space on your map to indicate the specific kinds of plants and animals you observed, record them on the back of the cardstock.







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5. Record any observations of organisms in their environment. For example, note insects feeding on plants or seeking shelter under rocks.

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a. **Sunlight exposure**– How much of the area is exposed to sunlight? Will this change and why? Has this affected the vegetation? Explain

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b. **Soil**- Color (do not just put brown) \_\_\_\_\_

c. **Rain**- When was the last rain recorded for this area? \_\_\_\_\_

d. **Maintenance**– Is the area maintained? Mowed and picked up? Describe

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e. **Water Drainage**– Is the area well drained, or does it have pools of water? Why?

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f. **Vegetation Cover**– How much of the soil is covered with vegetation? How much of the soil is exposed?

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g. **Evidence of Man**– Is there any evidence of human activity? Explain

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6. After completing these observations, identify a 2 meter x 2 meter area that you would like to study in more detail. One large step is equivalent to 1 meter.







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7. Use your hand lens to inspect the area,. Be careful not to disturb the soil or the organisms. Then record the types of insects and plants you see. Use your field guides to identify one species of plant or insect. **You must check to see if you are correct. Be ready to show the organism and the picture in the field guide. List the organisms you have identified and draw a picture of at least one of them.**

Organisms	Drawing

8. Collect a small sample of soil with your spoon, and observe it with your hand lens. **Record a description of the soil and the organisms that live in it.**

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9. Go to another group's plot. List at least 5 differences and 5 similarities between them.

## Differences

## Similarities

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Name(s) \_\_\_\_\_

## Introduction to Biomes

Biomes definition:

The world's major communities, classified according to the predominant vegetation and characterized by the adaptations of organisms to that particular environment.

-or-

A major type of ecosystem with a distinctive climate and organisms.

## Objectives

## Standards

## Materials

- Refuge Guide

## Prairie Biome

1. List four common species of animals that are common to this biome. If you don't see them, list the evidence.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

2. List two adaptations that these animals have to survive here.

1. \_\_\_\_\_
2. \_\_\_\_\_

3. List four common species of plants that are common to this biome.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

4. List two adaptations that these plants have to survive here.

1. \_\_\_\_\_
2. \_\_\_\_\_







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5. Name an invasive species to this biome. What is being done to manage its spread?

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6. What is being done to manage this prairie?

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## Wetland Biome

1. List four common species of animals that are common to this biome. If you don't see them, list the evidence.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

2. List two adaptations that these animals have to survive here.

1. \_\_\_\_\_
2. \_\_\_\_\_

3. List two common species of plants that are common to this biome.

1. \_\_\_\_\_
2. \_\_\_\_\_

4. List two adaptations that these plants have to survive here.

1. \_\_\_\_\_
2. \_\_\_\_\_

5. Name an invasive species to this biome. What is being done to manage its spread?

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6. In what ways is the wetland biome important to people?

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## Deciduous Forest

1. List four common species of animals that are common to this biome. If you don't see them, list the evidence.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

2. List two adaptations that these animals have to survive here.

1. \_\_\_\_\_
2. \_\_\_\_\_

3. List four common species of plants that are common to this biome.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

4. List two adaptations that these plants have to survive here.

1. \_\_\_\_\_
2. \_\_\_\_\_

5. Name an invasive species to this biome. What is being done to manage its spread?

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## Fisheries

1. Describe three things that you learned from the presentation.

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# Observing Birds in the Wild

**Grade: 12**

**Duration**  
**60-90 minutes**

## **Supplies**

- Activity sheets
- Binoculars
- Birds of Nebraska Guidebook

## **Summary**

Observing birds in the wild is fun but does take some patience and skill. The observer must be able to locate the bird, watch what it is doing and try to identify it all within a few moments. This activity concentrates on looking for different behaviors exhibited by songbirds.

Songbirds may be perching on a branch, singing to attract mates, feeding their young, searching for food on the ground, preening their feathers-really any number of behaviors. A bird's behavior may be a particular adaptation to help the bird survive. For example, flocking is a behavioral adaptation that helps protect a bird from a predator. Behavior may be specific to one species or found in many species. A White-breasted Nuthatch can walk down a tree head-first. Most woodpeckers prop on the sides of trees. Many sparrows feed on or near the ground. Knowing the behavior patterns of birds and of different species of birds is fundamental to our understanding of songbirds and can help in their conservation.

Before going out to observe birds in an area, think about where birds may be found and what time birds will be most active based on what time of year it is and what weather exists. Most songbirds tend to be very active in the morning and early evening.

## **Objectives**

Students will identify different behavior patterns of birds and explain their function.

## **Procedure**

1. In this exercise, students will be looking for birds exhibiting different types of behavior, like flying, swimming, or singing. When a behavior is spotted, place a check in the space provided on the worksheet. Identify the species if possible.
2. Go over these tips for bird observations:
  - Before beginning fieldwork, dress in comfortable clothing that is dully-colored. This helps the observer blend into the natural habitats being explored. Also, sneakers are good footgear as they enable to observer to move about quietly. Move slowly and freeze in place after flushing birds and they may return to allow for observation







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# Observing Birds in the Wild

- Gather needed equipment-field guide, binoculars (if possible), a notebook, pencil and worksheet.
  - Get permission from landowners to walk on private property. To see the most variety of birds, try to visit a local wildlife sanctuary, state park, or federal refuge. Always check water bodies to see if any birds are sitting or wading in the pond or along its edge.
  - Try to search for birds within an hour or two of dawn or a couple of hours before dusk. These are the times when birds are most active, especially in spring or summer.
  - If the bird's name is known, record it; otherwise, note its colors, distinguishing features and observed behavior and try to use a field guide to identify it.
  - Don't forget to record the type of natural habitat where the bird is observed. Look at the surroundings carefully. Then, describe the physical environment, including the types of plants present, the time of year, and the weather. This information will help the student/observer understand the natural conditions each species needs to survive.
  - Always remember-the natural environment comes first. Never harm or disturb an animal, plant or nest. Also, never take an animal away from its habitat. No bird, or other creature, can exist for very long away from its own environment.
3. Choose an area and take students out to conduct the search. Students can work individually, in pairs or in groups.
  4. Return to the classroom and summarize the information. Have students discuss why a particular behavior may be a benefit or detriment to a bird. Consider the following questions: Were any behaviors not observed? Why? Did any single species seem to be exhibiting a particular type of behavior? Why?







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### Bird Identification

Noticing how birds look, act and sound are the first steps toward bird identification. Some key points to bird identification are size, shape, wings, tail, legs and feet, field marks, and body patterns. Compare sizes of other birds. Use familiar birds such as a crow, sparrow or robin when making size comparisons. Look at whether the bird is chunky or slender and examine the bill shape and length. Wings can be looked at to determine flying style. Long and narrow wings usually indicate long-distance flying and maybe flying over water. Long and broad wings are for soaring over land. Length, shape, and uses of the tail are an important clue in identifying the bird. Shape and size of legs and feet can tell about the habits and habitat of a bird. Make sure to note head shape, color pattern on face, eye rings, eyebrow, eye line, light and dark contrasts, as well as any other field marks. Also, notice if there are any patterns, or contrasts in color, on the body or the tail. Along with a field guide, this information can be used to identify the bird.

Bird behavior can help to identify the particular species. Behavior is easily observed at backyard feeders. Differences in behaviors related to eating, sleeping, mating, singing, flying, and in perching can be noted between different species of birds. Birds exhibit specific patterns in flight. Some birds fly fast, slow, erratic, in straight lines, or not at all. Birds vary in feeding behaviors. Some feed on the ground like robins, others in water like many ducks, or in the air like chimney swifts. Eastern phoebes can grab a mosquito in flight. Birds use songs for vocalization. Songs are species-specific and can help with bird identification. Nests are also often species specific. Birds are very particular about the materials used and placement of their nests. For example, robins build a nest with some dried mud and use sticks and grasses to form the bowl, and usually nests are in the forks of branches. Color, size, shape, and number of eggs will vary between species of birds.







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Name \_\_\_\_\_ Block \_\_\_\_\_

### Wildlife Refuge Management

What is the comprehensive conservation plan CCP?

Who helps write it?

What is the name of the Refuge Manager at DeSoto?

Wetland-

What types methods can used to restore wetlands? List 2

What type is used at this location?

Farmland-

What was farmland used for in the past?

What does the refuge plan to do with the farmland?

Prairie

As talked about in our last trip, what is the refuge planning to do with these prairies?

River

Name 3 endangered species that can be found near or on this refuge.

Pick one and describe what this means in regards to management?

**Refuge visitor uses:**

**Hunting, fishing, wildlife observations, photography, education, and interpretation**

**Paragraph-**Pick one of the above visitors uses and describe how it's managed on the refuge.







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Name(s) \_\_\_\_\_

## Soil Lab

### Materials

Bag containing:

- Spoon
- Extraction tube (the large plastic tube)
- 3 square plastic tubes labeled K-Potassium, N-Nitrogen, P-Phosphorous
- 4 boxes of tablets (potassium, phosphorous, nitrates, and Floc Ex)
- 2 pipets
- Soil thermometer and skinny metal thermometer
- Large bottle of distilled water
- Hand lens

### Procedure

Each group will be assigned an area to do their testing. We have a lot to do on this trip, so please stay on task. Do not dispose of anything or dump anything at the Refuge. I will have a bucket for all waste liquid/soil solutions.

Once you have reached your assigned area, please follow these instructions, record your data, and answer the questions.

1. Describe the overall area as if you were telling somebody who couldn't see it:

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2. Record the following. You will need to leave the thermometer at each site until the temperature remains constant for about 3 minutes.

Use the skinny metal thermometer for air temperature.

- a. Air temp in sunlight \_\_\_\_\_
- b. Air temp in shade \_\_\_\_\_
- c. Why is there a difference? \_\_\_\_\_

Use the same thermometer to take the temperature at the soil surface under the leaf litter.

- a. Air temp under organic matter \_\_\_\_\_

Use soil thermometer—green top

- a. Soil temperature approx. two inches down \_\_\_\_\_







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b. Why is there a difference?

Why does the temperature of the soil matter? \_\_\_\_\_

Look at the instruction on the brown folded lab sheet. Follow these instructions for getting your soil extraction, and then continue on to the phosphorous, nitrate, and potassium test. Record your data below. Use the laminated colored chart to determine your results. You must wait the designated amount of time for each test. The results take awhile to develop. The questions in italics need to be answered prior to doing the lab using the information sheets provided.

1. Phosphorous test results \_\_\_\_\_

*What is phosphorus necessary for?* \_\_\_\_\_

*What changes the phosphorus in the soil into available forms?* \_\_\_\_\_

*How does pH affect the phosphorous?* \_\_\_\_\_

*Give 2 characteristics of plants that lack phosphorous*

\_\_\_\_\_  
*Would you be able to notice if a plant has been given to much phosphorous? Why?*

\_\_\_\_\_  
Look at your field data, are plants receiving enough phosphorous? \_\_\_\_\_

Does this area need fertilizers added? \_\_\_\_\_

2. Nitrogen test results \_\_\_\_\_

*Why is Nitrogen necessary to plants?* \_\_\_\_\_

*List two ways to increase the amount of Nitrogen in your soil*

\_\_\_\_\_  
*How do you know if your plant is lacking in Nitrogen?*

\_\_\_\_\_  
*What could happen if you give a plant too much Nitrogen?*

\_\_\_\_\_  
Look at your field data, are plants receiving enough nitrogen? \_\_\_\_\_

Does this area need fertilizers added? \_\_\_\_\_

3. Potassium test results \_\_\_\_\_

*List three reasons potassium is necessary for plants*

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_

*List three characteristics of plants that need more potassium*

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_

*If a plant is receiving too much potassium, what could happen?*

\_\_\_\_\_







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4. I will be around with a pH, moisture, and light meter probe.

Record the pH of the soil \_\_\_\_\_

How does the pH of the soil affect plants? \_\_\_\_\_

What do most plants prefer? \_\_\_\_\_

List four plants that would prefer your soil's pH

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_

4. \_\_\_\_\_

What would you do to raise the pH of your soil? \_\_\_\_\_

What would you do to lower the pH of your soil? \_\_\_\_\_

How much moisture is in the soil? \_\_\_\_\_

Does your soil need more or less moisture? \_\_\_\_\_

If this was your lawn or house plant, what would you do? \_\_\_\_\_

What is the light reading? \_\_\_\_\_

Why would you want or need to know this? \_\_\_\_\_

Describe the vegetation in the area in at least 4 sentences. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Draw a picture of 1 plant species that you see.

Healthy soil has many soil organisms. Use a hand lens to locate at least one soil organism. Draw a picture of an organism that you see in your soil.







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Name(s) \_\_\_\_\_

## Urban Water Quality Testing—DeSoto Field Trip

### Materials

- Urban Water Test Kit

### Procedure

1. Make 8-10 observations about your collection site using site, sound, and smell.

2. Coliform test—We will record results next class period.

Results \_\_\_\_\_ p. 11-12

3. Chlorine Results \_\_\_\_\_ p. 13-14

4. Copper Results \_\_\_\_\_ p. 15-16

5. Dissolved Oxygen Results \_\_\_\_\_ ppm p. 17-19

6. Hardness \_\_\_\_\_ p. 20-21

Multiply the number of tablets used by 40. \_\_\_\_\_ # of tablets x 40 = \_\_\_\_\_

Greater than 50 ppm is considered hard water.

7. Iron \_\_\_\_\_ p. 22-23

8. Nitrate \_\_\_\_\_ p. 24-25

Unpolluted water is below 4 ppm. Greater than 40 ppm is unsafe to drink.

9. pH \_\_\_\_\_ p. 26-27

10. Phosphate \_\_\_\_\_ p. 28-29

Greater than .03 ppm contribute to increased plant growth.

11. Temperature \_\_\_\_\_ p. 30-31







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Name(s) \_\_\_\_\_

### Water Quality Testing / Environmental Science / DeSoto Field Trip

#### Materials

- Calorimeter w/multicolored handout instructions
- Test strips w/instructions
- Kit w/instructions

#### Procedure

Circle location assigned:                      **Bullhead Pond**                      **Ditch**                      **Missouri River**                      **Road Pond**

Make 8-10 Observations about your collection site. Describe the watershed.

#### Cargill Probes—Get results at picnic table

pH results \_\_\_\_\_ DO results \_\_\_\_\_

#### Calorimeter—Follow instructions in multicolored handouts at picnic table

Be sure to include the label that appears on the machine

Turbidity \_\_\_\_\_ Nitrate \_\_\_\_\_

Phosphorus \_\_\_\_\_ -if time                      pH \_\_\_\_\_ -if time

#### Test Strips—Follow instructions on the bottle- Not every group will do both, do the tests that are in your clear container

Ammonia results \_\_\_\_\_ Phosphorus results \_\_\_\_\_

#### Kit results—Follow instructions in the kit

1. Dissolved Oxygen results \_\_\_\_\_ ppm p. 16-19

Temperature \_\_\_\_\_ Celsius \_\_\_\_\_ Fahrenheit                      Use thermometer

Record percent saturation in water \_\_\_\_\_ p. 19

Rank \_\_\_\_\_ p. 32-33







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2. Nitrate results \_\_\_\_\_ p. 22-25

Rank \_\_\_\_\_ p. 32-33

3. pH results \_\_\_\_\_ p. 24-25

Rank \_\_\_\_\_ p. 32-33

4. Phosphate results \_\_\_\_\_ p. 26

Rank \_\_\_\_\_ p. 32-33

5. Turbidity results \_\_\_\_\_ p. 30-31

Rank \_\_\_\_\_ p. 32-33







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Name(s) \_\_\_\_\_

## Fire Ecology Lab

### Pre-Lab Questions

1. Define Ecological Succession-

Primary Succession -

Secondary Succession-

2. What is a pioneer species?

3. What is a climax community?

4. Give an example of a natural cause of secondary succession.

5. **Draw a picture of succession happening from page 140.**







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## Use Fire Sheet

1. Name five reasons someone would do a management-ignited prescribed burn
2. What five elements are considered before fire managers do a burn?
3. Name five things that someone on the fire crew must wear.
4. What are three examples of natural firebreaks?
5. What is a drip torch?
6. What is a hand line?
7. List two similarities and two differences between a headfire and a backfire.
8. How long does it take for new growth to appear?
9. Name three tall grass species that appear first.
10. List three invaders that they might be trying to get rid of.







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Name(s) \_\_\_\_\_

## Fire Ecology Lab

### Materials

- Calorimeter w/multicolored handout instructions
- Test strips w/instructions

### Procedure

Observe the field that hasn't been burned. Write at least 5 sentences about your observations. Describe it as though you were telling someone who couldn't see it. Use all the following: sight, sound, and smell.

Take a soil temperature, surface temperature, and moisture content for the unburned area.

Location A    Soil \_\_\_\_\_                      Surface \_\_\_\_\_                      Moisture \_\_\_\_\_ (provided)

Measure the height of the tallest plant you see. \_\_\_\_\_

Write at least 5 sentences on your observations of the burned field. Describe it as though you were telling someone who couldn't see it. Use all the following: sight, sound, and smell.

Take a soil temperature, surface temperature, and moisture content for the burned area.

Location A    Soil \_\_\_\_\_                      Surface \_\_\_\_\_                      Moisture \_\_\_\_\_ (provided)

Measure the height of the tallest plant you see. \_\_\_\_\_







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Explain why there is a difference between the two sites in regards to soil and surface temperature.

### Discussion Questions

1. How do they know what fields to burn and when?
2. How often do they burn?
3. If you were in charge of a prescribed burn at the Refuge, what 3 factors determine whether you burn that day?
4. What would happen to this prairie without fire?
5. Name 2 or more purposes of prescribed burns.
6. List 3 plants that they are trying to get rid of?
7. Name 3 examples of native grasses?
8. What is a serotinous cone? Do they exist in the prairie?
9. Name 2 adaptations that plants have to survive fire?
10. What adaptations do animals in the prairie have to survive a fire?
11. How long does it take for things to grow again?







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12. What is the difference between a backfire and headfire? Can you tell where the fire was lit?
13. How many people does it take to do a prescribed burn?
14. If we did the nitrogen, phosphorous, and potassium test again in the burned field, would the results be higher, lower, or the same? Why?







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## Scope and Sequence

### 3rd Grade—October

Content	Skills	Assessment	Instructional Strategies	Notes
A. Observation as science B. Descriptive writing C. Sound mapping D. Color mapping	A. Make careful observation about the natural world B. Use environmental as a context for descriptive and reflective writing C. Students map a certain area based on color and sounds, applying observation skills	A. Students' journals B. Discussion C. Classroom reflection	A. Discuss how to make observations in nature B. What makes a good naturalist? C. Discovery hike D. Sound map E. Color map F. Hand lens looking	

### 3rd Grade—November

Content	Skills	Assessment	Instructional Strategies	Notes
A. Observation as science B. Descriptive writing and detailed observation note taking	A. Make careful observation about the natural world B. Use environmental as a context for descriptive and reflective writing C. Use bird migration as a catalyst for studying natural, seasonal change.	A. Students' journals B. Discussion C. Classroom reflection	A. Discuss how to make observations in nature B. Binocular and bird identification lesson C. Develop skills in note taking and using observational details for science.	







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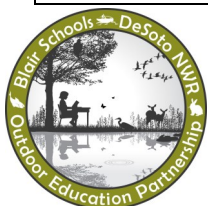


## 3rd Grade—February

Content	Skills	Assessment	Instructional Strategies	Notes
A. Observe animals in winter B. Descriptive writing	A. Observe animal signs without destroying them B. Describe an animal clue using multiple characteristics (size, shape, direction, patter, etc.) C. Use evidence of winter animal to infer about animal (direction of travel, pace, gait, etc.) D. Enjoy exploring outside in winter	A. Students' journals B. Discussion C. Classroom reflection	A. Wildlife mysteries lesson—modified from a lesson from the Prairie Wetlands Learning Center, MN B. Journaling before, during, and after lesson	

## 3rd Grade—April

Content	Skills	Assessment	Instructional Strategies	Notes
A. Observation as science B. Descriptive writing C. Sound/color mapping D. Wetland wondering	A. Make careful observation about the natural world B. Use environmental as a context for descriptive and reflective writing C. Students map a certain area based on its color and sounds, applying observation skills	A. Students' journals B. Discussion C. Classroom reflection	A. Discuss how to make observations in nature B. What makes a good naturalist? C. Discovery hike D. Sound map E. Color map F. Wetland wondering	







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## 5th Grade—September

Content	Skills	Assessment	Instructional Strategies	Notes
A. Sense of Wonder—Rachel Carson and how to be a good naturalist	A. Observing nature B. Descriptive writing C. Exploring D. Drawing conclusions about nature E. Reflecting on outdoor experience	A. Students' journals B. Discussion C. Classroom reflection	A. Discuss Rachel Carson as a naturalist B. Discuss naturalists as scientists C. Describe what a naturalist does D. Practice being naturalists in the field	This lesson teaches the naturalists skills that will be used on all future lessons. Naturalist skills are reviewed at the beginning of all subsequent lessons.

## 5th Grade—September

Content	Skills	Assessment	Instructional Strategies	Notes
A. Investigate prairie plants using appropriate tools B. Explain one way that prairie restoration happens C. List two adaptations of prairie seeds D. Recognize the parts of prairie seeds	A. Observing nature B. Descriptive writing C. Exploring D. Drawing conclusions about nature E. Reflecting on outdoor experience	A. Students' journals B. Discussion C. Classroom reflection	A. Powerpoint on DeSoto prairie plants and parts of prairie seeds B. Outdoor exploration of prairie with journaling component C. Follow-up discussion on discoveries	







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## 5th Grade—October

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students will recognize beavers as a major factor on the landscape.</p> <p>B. Students will be able to name five beaver adaptations.</p> <p>C. Students will investigate a beaver site using three or more different investigation techniques (sight, sound, tracks, etc.)</p> <p>D. Students will draw conclusions about beaver activity</p>	<p>E. Observation skills</p> <p>F. Listening skills</p> <p>G. Scientific Investigation/ Method</p> <p>H. Drawing conclusions about nature</p> <p>I. Reflecting on outdoor experience</p>	<p>A. Answers given by students during Build a Beaver activity</p> <p>B. Student journal writing for pre and post activity</p> <p>C. Presentations of beaver site evidence</p> <p>D. Wrap up discussion questions and answers</p>	<p>A. Build a Beaver activity— a student dresses up as a beaver with items symbolizing the adaptations of a beaver</p> <p>B. Scientific investigation of a beaver site</p> <p>C. Student presentation on findings of beaver site</p> <p>D. Wrap-up discussion of discoveries</p>	<p>Build a beaver box kept at Arbor, beaver hide and skull kept at DeSoto.</p>

## 5th Grade—November

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students will recognize a wetland</p> <p>B. Students will be able to describe three characteristics of wetlands</p> <p>C. Students use field guides, binoculars and spotting scopes to identify migrating waterfowl using refuge wetlands</p>	<p>A. Observation skills</p> <p>B. Listening skills</p> <p>C. Scientific investigation/ Method</p> <p>D. Drawing conclusions about nature</p> <p>E. Reflection on outdoor experience</p>	<p>A. Journal entries</p> <p>B. Participation in the Wetlands Wonders pre-lesson activity</p> <p>C. Wrap-up discussion</p>	<p>A. Students participate in “Wetland Wonders” ranger talk to learn about functions, structure and importance of wetlands</p> <p>B. Students learn how to use field guides and binoculars</p> <p>C. Visit one or more wetlands to look for migrating waterfowl</p>	







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## 5th Grade—January

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students study animal tracks in the winter</p> <p>B. Students observe birds at the winter feeders</p>	<p>A. Observation skills</p> <p>B. Listening skills</p> <p>C. Scientific Investigation/ Method</p> <p>D. Drawing conclusions about nature</p> <p>E. Reflecting on outdoor experience</p>	<p>A. Journal pages on “Winter Birds at DeSoto” and “Animal Tracks at DeSoto”</p> <p>B. Answers to questions during group lesson</p> <p>C. Observations shared during wrap up</p>	<p>A. Students are read a passage from <u>A Sand County Almanac</u> called “January Thaw” that describes winter as a great time for outdoor observation</p> <p>B. Students are asked to consider what animal made the track, why and where it was going</p> <p>C. Students are given binoculars and field guides to use for birding indoors</p> <p>D. Students will make observations about the birds at the feeders including name, size behaviors and a drawing</p>	

## 5th Grade—March

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Explain four characteristics of the bald eagle that make it a successful predator</p> <p>B. Articulate the reason why bald eagles became an endangered species and two reasons why the bald eagle recovered</p> <p>C. Distinguish between what is and what isn’t good habitat for nesting bald eagles</p>	<p>A. Observation skills</p> <p>B. Listening skills</p> <p>C. Scientific Investigation/ Method</p> <p>D. Drawing conclusions about nature</p> <p>E. Reflecting on outdoor experience</p>	<p>A. Students’ journals</p> <p>B. Wrap-up discussion to gauge student retention of concepts</p>	<p>A. Lesson on why the bald eagle is a good predator. Incorporates bald eagle mount, wing span comparison, and eye comparison interactive elements</p> <p>B. Refuge tour to observe bald eagles using spotting scopes and binoculars</p> <p>C. Stop at eagle nest to look for nesting activity</p>	







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## 5th Grade—April

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students sit quietly for one hour to observe nature</p> <p>B. Describe the activity using at least five descriptive words and phrases</p> <p>C. Make five observations each for sight, sound, feel and smell</p>	<p>A. Observation skills</p> <p>B. Listening skills</p> <p>C. Scientific Investigation/ Method</p> <p>D. Drawing conclusions about nature</p> <p>E. Reflecting on outdoor experience</p>	<p>A. Students' journals</p> <p>B. Wrap-up session to discuss observations and feelings of the quiet hour in nature</p>	<p>A. Indoor session prepares students for careful nature observation. Students use descriptive words to describe smell, feel and sound.</p> <p>B. Outside teachers place students apart on a trail where they sit quietly for an hour, observing and journaling</p> <p>C. Wrap up session to share observations and feelings</p>	

## 5th Grade—May

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students use a key to identify and classify at least three different aquatic invertebrates</p> <p>B. Students choose appropriate method for collecting wetland samples</p> <p>C. Students describe at least two reasons why it is important to protect wetlands</p>	<p>A. Observation skills</p> <p>B. Listening skills</p> <p>C. Scientific Investigation/ Method</p> <p>D. Drawing conclusions about nature</p> <p>E. Reflecting on outdoor experience</p>	<p>A. Students' journals</p> <p>B. Wrap-up session</p>	<p>A. Introduction session teaches students how to use the “Key to Life in the Pond” and wetland study equipment</p> <p>B. Students work in groups to catch and identify macroinvertebrates</p> <p>C. Wrap up session to describe discoveries</p>	







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## 6th Grade—October

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students will complete a writing assignment related to fall experiences.</p> <p>B. Leaf printing to show chlorophyll colors in fall leaves</p> <p>C. Structure vs. function lesson</p>	<p>A. Students will apply writing concepts using the outdoor classroom for inspiration</p> <p>B. Students will use leaf printing to see chlorophyll first hand</p> <p>C. Students apply lessons on structure vs. function to an outdoor lab</p>	<p>A. Student worksheets</p> <p>B. Post lesson discussions</p>	<p>A. Activity sheet for structure and function where students examine two structures using bare eyes and hand lens, then write about the function.</p> <p>B. Teacher-led writing exercise</p> <p>C. Leaf printing on paper using hammers to break leaves to reveal color</p>	

## 6th Grade—November

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students learn about migrating birds at DeSoto</p> <p>B. Make connections between the migrating birds and how some of the species use Canada as part of their life cycle</p>	<p>A. Students make connections between social studies lessons on Canada and the migrating birds at the Refuge</p> <p>B. Students recognize the interconnectedness of nature and they see the connection of migration through different countries</p>	<p>A. Students use range maps to see if the birds at DeSoto use their Canadian national park for part of their life cycle</p> <p>B. Additional writing component can be added next year</p>	<p>A. Students listen to a PowerPoint about the migrating birds at DeSoto. Each species includes a range map so students can see the full path of migration.</p> <p>B. Students get to observe birds on a wetland to make the real life connections with migration.</p>	







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## 6th Grade—January

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Students study the physical properties of snow</p> <p>B. Students draw geometry angles of snowflakes they observe</p> <p>C. Students study physical properties of items in the visitor center</p> <p>D. Students consider what animals need to survive in winter</p>	<p>A. Use tools to measure weight and mass of snow at different levels of snowpack</p> <p>B. Use hand lens to observe and draw snowflakes in great detail</p> <p>C. Observe physical properties of visitor center exhibits</p> <p>D. Use knowledge and reasoning to help a “creature” survive in winter</p>	<p>E. Student worksheets</p> <p>F. Post lesson discussions</p>	<p>A. Students build a snow fort outside and then use tools to measure weight and mass at different levels of the fort</p> <p>B. Use a hand lens to sketch a snowflake, then label the angles using the proper geometry angle</p> <p>C. Observe four items from the visitor center exhibits and describe their physical properties from the chart</p> <p>D. Hide a jell-o animal in a shelter and check on it in 10 minutes to see if</p>	







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## 7th Grade—September

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Learn native habitats of the Missouri River Valley</p> <p>B. Use quantitative and qualitative observations to learn about ecosystems</p> <p>C. Use direct and indirect observations and abiotic factors to learn about ecosystems</p>	<p>A. Observation skills</p> <p>B. Scientific note keeping</p> <p>C. Draw conclusions about nature</p>	<p>A. Student worksheets</p> <p>B. Post lesson discussions</p>	<p>A. Students follow a worksheet to observe DeSoto Lake, Hardwood Forests, and the Prairie</p> <p>B. Make careful observations and record them on the sheet</p>	

## 7th Grade—October

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Study insects in the prairie</p> <p>B. Study insects in the wetlands</p>	<p>A. Observation skills</p> <p>B. Scientific note keeping</p> <p>C. Draw conclusions about nature</p>	<p>A. Student worksheets</p> <p>B. Post lesson discussions</p>	<p>A. Students follow worksheet that guides insect observation for the wetland and the prairie</p> <p>B. Instructors give detailed directions on how to use equipment before they start the lab</p>	







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## 7th Grade—November

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Use GPS technology to complete activity</p> <p>B. Learn about animal habitats and needs of animals (food, water, shelter)</p>	<p>A. Learn to use GPS technology</p> <p>B. Apply knowledge about animal habitat needs to place food, water and shelter cards and marking them with GPS locations</p> <p>C. Teamwork skills are used during activity</p>	<p>A. Success of students finding the hidden cards will help assess how well the first group used the technology to hide and mark the cards</p>	<p>A. In class, students learn about habitat needs of animals</p> <p>B. Students learn how to use a GPS unit and practice using it</p> <p>C. Hands-on exploration using GPS gives students a chance to use their new skills</p>	

## 7th Grade—Bertrand

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Learn about Steamboat Bertrand</p> <p>B. Learn about steamboating era on the Missouri River and make connections with its importance</p> <p>C. Put Bertrand into the context of Civil War History</p> <p>D. Learn about museum operations and what it takes to conserve a large museum collection</p>	<p>A. Students learn about history and how people work to preserve history</p> <p>B. Students are able to go behind the scenes of the Bertrand exhibit and in doing so have to practice being calm, quiet, and following directions.</p>	<p>A. Student worksheets</p> <p>B. Post lesson discussions</p> <p>C. Questioning by teachers and refuge staff during lesson.</p>	<p>A. Museum curator visits class ahead of trip to talk about Bertrand and the Civil War</p> <p>B. Three stations at the visitor center. Cargo gallery where an activity sheet is completed, Bertrand movie, and the behind the scenes tour.</p>	







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## 7th Grade—April

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Creative writing assignment related to Greek Mythology</p> <p>B. Math lesson using a tree plot to set up a proportion to estimate the number of trees in a larger plot</p> <p>C. Math lesson to calculate the speed of the Missouri River</p>	<p>A. Creative writing</p> <p>B. Applying math topics such as proportions and calculating speed of river.</p>	<p>A. Students will turn in creative writing assignment for a grade</p> <p>B. Students will turn in tree estimation worksheet for a grade</p>	<p>A. Students will apply skills learned in the traditional classroom to the outdoor classroom. This includes calculating speed, proportions, and creative writing</p>	







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## 8th Grade—October

Content	Skills	Assessment	Instructional Strategies	Notes
A. In preparation for state writing exams, students use DeSoto NWR as inspiration for descriptive writing	A. Practice descriptive writing using an authentic, place-based context B. Students are expected to use all descriptive writing conventions learned in the classroom	A. Student writing is used as an assessment	A. This outdoor lesson follows up on teaching in the classroom on descriptive writing techniques and practice in a classroom setting	

## 8th Grade—November

Content	Skills	Assessment	Instructional Strategies	Notes
A. Students use DeSoto NWR as a context to apply the five themes of geography (place, location, human/environment interaction, region and movement) B. While observing migratory birds, students record species and numbers of birds to use in math lessons back at school C. Learn about refuge management techniques	A. Application of skills learned in geography class B. Observation and identification skills of migratory birds C. Put information learned during DeSoto trip into context with refuge management	A. Student worksheets for geography and bird observation B. Post lesson discussions	A. Refuge staff present on refuge management techniques using a power point presentation B. Students hike around visitor center and make observations for geography lesson C. Refuge staff and teachers set up spotting scopes on a wetland and students use binoculars and guide books to identify migratory birds	







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## 8th Grade—March

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Using the Bertrand cargo gallery, students count the number of a certain artifact on display and use that to find its proportion of total cargo.</p> <p>B. Students see a life size representation of the Bertrand (using flags) and use that in math lessons.</p> <p>C. Students view a film about the National Wildlife Refuge System to help put DeSoto in context of the larger refuge system.</p>	<p>A. Apply math skills learned in the classroom to the visitor center setting.</p> <p>B. Students work as a team on outdoor activity.</p>	<p>A. Student worksheets for proportion lesson</p> <p>B. Post-lesson discussions</p>	<p>A. In-school lessons on proportions and estimations are applied using the worksheet in the cargo gallery.</p>	







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## High School Environmental Science—September

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Survey an area of land and determine the land's physical features and the types of organisms that live there.</p> <p>B. Identify possible relationships between the organisms that live in the area of land you surveyed.</p>	<p>A. Careful observation of a plot of land</p> <p>B. Preparing a site map to document area using symbols to represent features of the plot</p> <p>C. Consider a variety of characteristics to help assess the plot</p>	<p>A. Students will turn in site map that will be used to assess how well students were able to apply the concepts</p>	<p>A. Students learn about ecosystems in the classroom prior to their trip to DeSoto.</p> <p>B. Students draw a site map using symbols to represent their ecosystem</p> <p>C. Using the site map, assess the quality of the ecosystem in terms of environmental factors and biodiversity.</p>	

## High School Environmental Science—October

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Study three major biomes of DeSoto (Deciduous forest, Prairie, and Wetland)</p> <p>B. Apply biology concepts such as common plants/animals, adaptations and invasive species to different biomes</p>	<p>A. Students will apply skills in observation and identification to document characteristics of biomes</p> <p>B. Students develop skills in documenting for science</p>	<p>A. Student worksheets will be used to assess the comprehension of the information</p>	<p>A. Students learn about the concept of biomes, adaptations and invasive species in the classroom</p> <p>B. Students apply concepts to observations about three different biomes at the refuge</p>	







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## High School Environmental Science—November

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Use characteristics and behaviors of birds to aid in identification</p> <p>B. Use book guides to identify birds observed on the refuge</p>	<p>A. Observation skills</p> <p>B. Organizing information to use in identifying birds</p>	<p>A. Students worksheets will be used for assessment</p>	<p>A. Lesson on bird characteristics and behaviors will give students context to identify birds</p> <p>B. Use field guides to identify birds from a worksheet and birds seen at DeSoto</p>	

## High School Environmental Science—March

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. During a soil study, record information on soil characteristics to assess soil quality</p> <p>B. Use scientific data collection methods to collect soil information</p> <p>C. Analyze soil information for trends and patterns</p>	<p>A. Use scientific method</p> <p>B. Observation skills</p> <p>C. Ability to make accurate scientific measurements</p>	<p>A. Student worksheets</p> <p>B. Post-trip class discussion</p>	<p>A. At school, students learn about soil characteristics, content, and how to assess soil quality</p> <p>B. Using knowledge from the in-class lesson, students complete a soil lab at DeSoto NWR</p>	







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## High School Environmental Science—April

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Conduct a lab on water quality at the refuge in three different locations</p> <p>B. Analyze water quality information for trends and patterns</p>	<p>A. Use of scientific method</p> <p>B. Observation skills</p> <p>C. Ability to make accurate scientific measurements</p>	<p>A. Students worksheets</p> <p>B. Post-trip class discussion</p>	<p>A. At school, students learn about water quality and how to assess it</p> <p>B. Using knowledge from the in-class lesson, students complete a water quality lab at DeSoto NWR</p>	

## High School Environmental Science—April

Content	Skills	Assessment	Instructional Strategies	Notes
<p>A. Learn about fire ecology</p> <p>B. Learn about how fire is used as a management tool</p> <p>C. Learn about how prescribed burns are conducted by refuge staff</p>	<p>A. Connecting information on ecological succession, pioneer species and climax communities to prescribed burning</p> <p>B. Practice listening skills to acquire information from refuge staff</p>	<p>A. Student worksheets</p> <p>B. Student questions and answers to presenter</p> <p>C. Post-trip class discussion</p>	<p>A. Study fire ecology in class</p> <p>B. Refuge staff presents on prescribed fire; why we burn, how we burn, and equipment used</p> <p>C. Students record information on worksheet during presentation</p>	

